

THE RAILWAY GAZETTE
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GOODS FOR EXPORT

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export

DISPATCH OF "THE RAILWAY GAZETTE" OVERSEAS

We would remind our readers that there are many overseas countries to which it is not permissible for private individuals to send printed journals and newspapers. The RAILWAY GAZETTE possesses the necessary permit and machinery for such dispatch, and any reader desirous of arranging for copies to be delivered to an agent or correspondent overseas should place the order with us together with the necessary delivery instructions.

We would emphasise that copies addressed to places in Great Britain should not be re-directed to places overseas, as they are stopped under the provisions of Statutory Rules & Orders No. 1190 of 1940, and No. 359 of 1941

ANSWERS TO ENQUIRIES

By reason of staff shortage due to enlistment, we regret that it is no longer possible for us to answer enquiries involving research, or to supply dates when articles appeared in back numbers, either by telephone or by letter

TO CALLERS AND TELEPHONERS

Until further notice our office hours are:
Mondays to Fridays 9.30 a.m. till 5.0 p.m.
The office is closed on Saturdays

Control of Thomas Cook & Son Ltd.

APPLICATION has been made to Parliament for an Act to empower the railways to give guarantees, and to make financial and other arrangements in connection with the acquisition by Hay's Wharf Cartage Co. Ltd., of the share capital of Thomas Cook & Son Ltd., the well-known travel organisation. This marks a considerable step in the plans, to which we referred in our issue of August 8, 1941, of the four main-line railway companies to acquire control of the tourist company. Nearly all the capital of Hay's Wharf Cartage Co. Ltd. (which in turn controls Pickfords Limited) is held by the railway companies. There will be wide satisfaction at the successful outcome of the negotiations which will result in the return to British hands of the control of the company, which since 1928, has been held by the Compagnie Internationale des Wagons-Lits et des Grands Express Europeens. Under the Defence Regulations the shares of Thos. Cook & Son Ltd., owned by the Wagons-Lits Company, are vested in the Custodian of Enemy Property. The Custodian has no money with which to finance Thomas Cook & Son Ltd., and it is partly for that reason, and in order to preserve such an old-established concern, that the sale is being negotiated. It is understood that the Wagons-Lits holding is regarded as a holding by a private enemy company. In such cases the Custodian is empowered to arrange for a company to continue working if its business is considered to be of national importance, or to wind it up. In the present case he has endeavoured to see that the company may carry on. The Custodian is not permitted to fix the price at which shares vested in him are sold, but a fair price is fixed by one of the six largest international firms of accountants.

Cheap Travel in Wartime

Our readers will be familiar with a number of the measures which have been taken to deter unnecessary travel on the railways during the war. There can be no doubt that the reduction in what may be termed pleasure-travel has been very considerable, and for this, of course, not only the deterrents applied by the Ministry of War Transport, but the general conditions prevailing have been in large part responsible. Nevertheless one step which was taken in the last war to reduce travel, the abolition of all cheap bookings, including monthly return tickets, has not so far been put into effect since the beginning of the present struggle, and there remain a number of cheap bookings available. It is possible, of course, that the Ministry has its own reasons for maintaining these bookings at the present juncture, and there can be no doubt that a large proportion of travel at the present time is by members of the Services, Government officials, and such persons as parents visiting evacuated children, for whom special facilities would necessarily have to be granted. The Government, too, has declared against the policy of general increases in the price of transport, and that indeed was one of the reasons for the existing financial agreement with the railways. Nevertheless, in the announcement made by the Chancellor of the Exchequer on the stabilisation of transport charges he dealt with the subject on a general basis, and it would be meticulous and typical of civil service mentality to contend that the abolition of cheap fare facilities would be a violation of the principles he then announced. Any curtailment of passenger facilities necessarily reacts on some portion of the travelling public, but in present circumstances there is a case for their withdrawal in view of the paramount need to conserve every available seat on a train for those engaged in essential business.

Planning the New Britain

In the two Houses of Parliament on February 11, the Government announced its decisions in fulfilment of its pledge to establish a Central Plan Authority. Statutory duties for town and country planning in England and Wales will be transferred from the Minister of Health to the Minister of Works & Buildings, whose title is to be changed to Minister of Works & Planning. This department will

exercise the powers of the Central Government under the Town & Country Planning Acts, and will lay down the general principles to which planning must conform. The Secretary for Scotland will continue his existing functions for planning in Scotland. The two ministers will be assisted by a committee of senior officials representing other departments affected by planning. The main function of the committee will be to ensure that as far as possible the national policy of urban and rural development shall be carried out as a single and consistent whole. There can be no doubt that one of the departments which will be intimately affected by planning of this kind will be the Ministry of War Transport, or whatever description its successor may bear after the war. At page 285 we give extracts from a speech made by Mr. W. H. Ansell, President of the Royal Institute of British Architects, in which he stresses the need for the consideration of transport facilities in the initial stages of any replanning. There can be no doubt not only of the wisdom, but of the vital necessity, of doing so if some of the major errors of the past are to be avoided in the future. It is fortunate that at this juncture there is in being the Railway Companies' Association Commission on Postwar Planning & Reconstruction which no doubt will work in close co-operation with the other planning authorities.

♦ ♦ ♦

Overseas Railway Traffics

In the 31st and 32nd weeks of the financial year most of the major Argentine railway companies continued to show substantial traffic increases. The best showing was made by the Buenos Ayres Western, which increased its receipts by 292,000 pesos as compared with a year ago; the Buenos Ayres Great Southern registered an advance of 274,000 pesos. Over the fortnight there was a decline of 110,000 pesos on the Buenos Ayres & Pacific Railway, but on the Central Argentine there was an improvement of 26,300 pesos. The Argentine North Eastern Railway scored an advance of 43,500 pesos; on the Antofagasta (Chili) & Bolivia Railway system there was an improvement of £6,320 for the 5th and 6th weeks of that railway company's financial year.

	No. of week	Weekly traffic	Inc. or decrease	Aggregate traffic	Inc. or decrease
Buenos Ayres & Pacific*	32nd	1,775,000	-65,000	43,683,000	+3,185,000
Buenos Ayres Great Southern*	32nd	3,027,000	+17,000	74,801,000	+8,032,000
Buenos Ayres Western*	32nd	814,000	-50,000	27,012,000	+4,508,000
Central Argentine*	32nd	1,809,100	—	56,345,450	+10,259,200
Canadian Pacific	6th	901,400	+220,800	4,633,400	1,025,000

* Traffic returns in thousands of pesos.

The San Paulo (Brazilian) Railway Company reports an improvement of £16,969 for the 4th and 5th weeks of its financial year as compared with the corresponding period a year ago.

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Belfast & County Down Railway

The report for the year 1941 states that the accounts are submitted in modified form and it is therefore not possible in the public interest to go into the same detail as formerly as to the operations of the company. The following is a summary of the results, compared with those of the preceding year:—

	1940	1941
Net receipts from businesses	13,060	126,628
Miscellaneous receipts, net	6,426	8,997
Total net income	19,486	135,625

From the figures it will be apparent that there has been a very considerable increase in traffic during the year, and this increase has been general throughout the system. Operating costs were also higher, both in wages and in materials, and difficulty was experienced in obtaining supplies. Dividends on the 3 per cent. baronial guaranteed shares and the 4½ per cent. "A" preference stock for the half year absorbed £1,635, and the balance of £40,867 admits of the payment of a dividend on the "A" preference stock for the second half of the year, amounting to £1,125. The directors recommend the payment of arrears of dividend on the 5 per cent. preference stock for the years 1926, 1927, and 1928, accounting for a further £37,221, and leaving £2,521 to be carried forward.

Refreshments on U.S.A. Trains

The extent to which food and drink influence the arrangement and equipment of the modern express is well illustrated by the composition of the new streamline trains for the Empire State Express service of the New York Central System in the U.S.A. Second vehicle from the engine is a tavern-lounge for the use of passengers in the three parlour cars that follow, and then comes a 44-seat dining car. After four reclining-chair cars there is a second 44-seat dining car, and then a second set of four chair cars is brought up at the rear by a tavern-lounge-observation car for chair car passengers. In this 16-car train, therefore, two independent dining cars with their staffs, and two bars for light refreshments, chiefly liquid, no doubt, are incorporated. The proportions in the seating are 119 parlour car and 448 chair car seats, or 567 "assigned" seats—the seats actually booked by the passengers for their journeys—and 174 "temporary" seats, 88 in the dining cars and 86 for light refreshment and recreational purposes, in a train of which the tare weight, when all 16 cars are in use, is 826 tons. Practically every modern American long-distance train now includes light refreshment facilities of various kinds independently of the dining cars, so that provision may be made to cover all variations in the depth of passengers' purses.

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Sludge from Water Softening Plants

From time to time the problem of the disposal of the white sludge from the locomotive water softening plants of the L.N.E.R. has been considered, but never with very happy results, and the disposal has remained a source of expense as well as the sludge itself being an eyesore. In war conditions, moreover, it has proved more than merely an eyesore since it was found, early in the war, that on a moonlight night there was a dangerous glare from these sludge pits likely to attract the attention of enemy aircraft, and further expense was incurred in blacking them out. To do this old wagon sheets were laid across the top of the sludge. Now, however, the efforts of the District Manager, Peterborough, have triumphantly killed two birds with one stone, for a market has been found for some of this sludge, and wagons are being sent regularly from Peterborough to a firm of market gardeners in the south. Thus, not only is the company paid for this waste product itself, but the carriage on it is a further source of revenue. According to the *L.N.E.R. Magazine*, reports already received speak of land so treated producing outsize crops of lettuces, and high hopes are held that the "Grow More Food" campaign may receive further assistance from this sludge. It may be hoped that in this, as in many other ways, the urgent wartime consideration and solution of problems may prove of lasting benefit.

♦ ♦ ♦

Another Swiss Route Electrified

A further stage in the electrification of the Swiss railway system, which has a present strategic value and after the war will greatly benefit the busy tourist traffic between the Lake of Lucerne and the Bernese Oberland, has been reached by the conversion of the metre-gauge Brünig Railway, between Lucerne, Meiringen, and Interlaken. On this the principal operating difficulty, of course, is the Brünig pass, approached from the Lucerne direction by 6½ miles in which the line climbs 1,696 ft., mainly by rack-and-pinion working, and with an even steeper descent of 1,340 ft. in 3 miles, with a ruling gradient of 1 in 8, from the summit to the Aar valley at Meiringen. Lucerne is 1,437 ft. above sea level, the summit station on the Brünig pass is 3,297 ft., and Interlaken is 1,866 ft. Here the Brünig line links up at Interlaken Ost Station with the Berne—Lötschberg—Simplon and the Berner Oberland systems; the distance from Lucerne to Interlaken is 46 miles. Owing to the increased speed and haulage capacity of the new electric motorcoaches, as compared with the previous steam locomotives, and the elimination of stops for refuelling, rewatering, and changing engines, it is expected to cut the time of the fast summer trains by 15 per cent., and of the stopping trains by 21 per cent., which will bring the overall journey times down to 2 hr. and 2½ hr. respectively.

Standard Time and the Dispatching System

The introduction of standard railway time in the U.S.A., which formed the subject of an article at page 14 of our January 2 issue, was of considerable importance in facilitating safe working. The general inconvenience of having odd systems of time, both to the public and to the railway operating staff, is obvious, but there was another reason for instituting well-defined time zones and that was the importance of accurate watches and clocks to the reliable working of the train dispatching system. The consulting of watches and strict observance of certain rules regarding time intervals forms a vital link in the chain by which the dispatching system is made effective and the movement of "inferior" trains governed so that they leave the way clear for those "superior" to them. The importance of this was very great indeed in 1883, when there was hardly any signalling, as now understood, on the majority of American lines, and failure to comply with the dispatching and timetable rules might easily lead to a serious single-line accident. The institution of well-defined time zones was thus partly a safe working measure.

....

The P.R.R. Abolishes Classification Signals

The Standard Code used with the dispatching system on American railways employs, in addition to the ordinary headlight and regulation tail signals, two so-called classification signals, used to assist train crews to identify trains they have to meet or make way for, and enable the rules regarding superiority of trains to be acted on correctly. These signals are two green flags, or green lights, commonly called "signals for a following section," used to show that another portion of the same train has still to come and must be waited for on single lines; and two white flags or lights to denote an "extra" train, not indicated by a fixed timing but running to the dispatcher's orders. In earlier years some lines used red signals for a "following section." On railways such as the Pennsylvania, where the large amount of double track and general adoption of the most modern signalling methods has caused the dispatcher to become more of a traffic controller, as understood in Great Britain, the need for designating trains in this manner is comparatively little felt. Accordingly that railway is now doing away with the classification signals and its new locomotives are appearing without the twin two-sided lanterns on the smokebox, so long a feature of the American scene. White flag signals are seen in the lower picture on page 165 of our January 30 issue.

....

Locomotive Springing

The springing of locomotives and railway vehicles, especially passenger stock, is a highly important subject both technically and from the points of view of enginemen and railway travellers. Those with expert knowledge realise this very fully, and a great deal of painstaking and skilful experimental work has been done from time to time with the object of evolving types and arrangements of springs to meet requirements which in certain respects conflict. It is not only a matter of design, the materials used and the proportions of the springs but extends also to the manufacturing processes, the layout of the system of springing, and the components used in conjunction therewith. The stability of the locomotive and the effect produced on the track are largely influenced by the layout of the suspension system, and the comfort of the passengers in the train very considerably depends upon this same feature. The subject is one that deserves to be ventilated more, and the illustrated article appearing at page 263 of this issue will, it is hoped, assist in some degree to do so. Our contributor's observations concerning the riding of locomotives fitted throughout with laminated springs or with coil pattern springs coincide with our own experience in travelling on the footplate, namely that with the first the riding may be harsh and with the second too lively. Very few, if any, modern locomotives are, however, today fitted with coil springs alone.

Impending Railway Announcements

THE boards of the controlled railway undertakings will shortly issue their accounts for 1941 and, as the Minister of War Transport recently issued The Railway Companies (Accounts and Returns) Order extending to the 1941 accounts the relaxation from the companies' obligations to prepare a large number of financial and statistical returns previously granted in respect of the 1940 accounts, it follows that those to be issued for 1941 will in all probability be very severely curtailed as compared with those of pre-war years. Under the revised financial arrangements with the Government, which provide for a rental payment of £43,000,000 a year to the controlled undertakings for the control of their properties other than certain excluded items, it is probable that railway stockholders and the public generally will be left in the dark as to the actual results of the operations of the lines.

It is interesting to recall that on October 22, 1941, the Parliamentary Secretary to the Ministry of War Transport indicated in the House of Commons that the pool net revenue of the main-line railways and the London Passenger Transport Board for 1941 would probably come to considerably more than the pool figure for 1940, which was £42,300,000. He added also that the Minister proposed to issue a return for 1941 as soon as the accounts could be analysed after the conclusion of the year. On the assumption that this statement will follow the lines of the White Paper (Cmd. 6252) issued in respect of the 1940 accounts, it will merely show the receipts, expenditure, and net revenue of the controlled undertakings as a whole, without indicating the share of each individual undertaking's contribution to the pool. It is appreciated that the relative receipts and net contributions to the pool of the individual undertakings would not necessarily be a criterion of the work accomplished by each undertaking, for the reason that, to economise clerical labour, pre-war divisions of receipts between companies have been suspended and any available figures can, therefore, only be "originating" receipts. Even if comparable pre-war originating figures were available, any endeavour to assess on this basis the work performed by individual companies in present circumstances would be vitiated by the fact that material changes have occurred in the flow of traffic. Nevertheless we suggest that publication of the figures of the individual undertakings would be of considerable interest to railway stockholders and give some indication of the part being played by their particular undertaking in the national transport effort.

A further point is that doubt exists in some quarters as to whether traffic conveyed on behalf of the Government is being paid for and, if so, on what basis. Article 30 of the draft Railway Control Agreement scheduled to the Railways Agreement (Powers) Order of December 19, 1941, states that payments by Government Departments to the controlled undertakings in respect of services rendered to them by the undertakings, including the conveyance of traffic, will be in accordance with the Treasury instructions which were appended. These instructions lay down, *inter alia*, that it is intended that the charges to be made by the controlled undertakings should be on an economic basis. In the case of conveyance charges, however, the nature of this basis is not defined and some curiosity on the part of the stockholders may be pardonable. Because of the magnitude of the traffic involved, it would not be surprising if, to effect clerical economies both on the railways and in Government Departments, arrangements were made to charge agreed or average rates in respect of certain Departmental traffics. Support is lent to this suggestion by the fact that the Railways (Charges for Government Traffic) Order issued on January 28 (S.R. & O. 151), empowers the railway companies to enter into agreements with Government Departments in respect of the charges to be made for the carriage of merchandise, without the sanction of the Railway Rates Tribunal. No information has been published yet as to whether any such agreements have been completed and, if so, whether the basis can be regarded as economic. Although, on the reasonable assumption that the guaranteed rental has been exceeded in 1941, the point is of only academic interest at the moment, stock-

holders may fairly ask for some information on the point in view of possible eventualities at the close of hostilities.

The White Paper issued in connection with the 1940 Accounts gives no real indication of the level of expenditure on which the undertakings were operating as it included provision for war damage in the total expenditure, and with an eye to the possibilities which may arise after the war in this direction there can be no doubt of the desirability, from the point of view of the stockholders, of giving at least some general index of the fluctuations in this respect.

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Railway Nationalisation at 3 per cent?

ONCE more a member of the Labour Party has adduced the usual time-worn arguments in favour of the nationalisation of the railways. This time the spokesman is Mr. George Ridley, M.P., who, in an official Labour Party pamphlet: "The Railways, Retrospect and Prospect," puts forward the view that it would be cheaper for the State to buy the railways than to pay the present rental of £43,000,000 for the four main-line companies and the London Passenger Transport Board. He explains his contention as it applies to the four group companies by saying that their hiring figure is about £38,000,000 and the Stock Exchange value about £750,000,000. If for the purpose of purchase a loan was raised at 3 per cent. the interest charges would be £22,500,000, which, compared with the £38,000,000, would leave a balance of £15,500,000 a year for capital redemption, plant modernisation, or whatever else might be thought desirable. The fallacies in the project, like many others of its kind, are not difficult to find. Mr. Ridley must indeed be ingenious if he imagines that the Stock Exchange prices of securities bear a direct relationship to the actual worth of the undertaking of which they represent the capital. In present circumstances the progress and prospects of the war, the weight of taxation, and similar factors have greater influence on stock prices. If, however, Mr. Ridley is convinced of the value of stock prices, would he be prepared to back his view by supporting a sliding-scale for wage rates based on a railway stock price index? It is worth remembering, too, that the present rental figure of £38,000,000 has been agreed at a time when great sacrifices are being made in the national cause, is recognised as constituting a good bargain for the State, and that its lack of relation to the true present earning power of the companies is among the reasons for the depressed Stock Exchange values of the stocks. Mr. Ridley's pamphlet is not impressive in its arguments and is not strengthened by the fact that after devoting some 15 pages to a "history" of railways, he devotes merely a few lines at the end to an all-embracing transport policy involving railways, roads, air lines, canals, and coastwise shipping.

British Investments in Argentina

ONCE again representatives of the foreign-owned railways in Argentina have submitted a lengthy memorandum to the Minister of Public Works in which relief is sought from the disabilities from which the companies are now suffering. At page 285 we reproduce points from the memorandum. As will be seen it points out that despite decisions of the Supreme Court admitting the right of the railways to the protection of their invested capital and a legitimate return on that investment, the railways are witnessing the slow destruction of their property. The memorandum enumerates a number of ways in which the companies have suffered, and recalls that notes which were presented to the Argentine Government in 1940 and 1941, in which practical measures to meet the crisis were suggested, have failed to bring forth any ameliorative measures. It is, of course, impossible at this stage to hazard any guess as to whether the latest endeavour by the railways will achieve any better results than previous efforts, but at least the memorandum has the advantage of bringing up to date the various factors which act adversely on the companies, and of keeping the need for practical measures of assistance before the public, both in the Argentine and in Great Britain. It is obviously true that unless something is done to assist the railway companies they may well be unable to cope with the very heavy burdens which in all probability will be thrust upon them after the cessation of the war. When that time comes the inhabitants of vast tracks of Europe will have to turn to South America for their needs in meat and cereals. It would seem a short-sighted policy on the part of the Argentine Government to allow the railways to deteriorate for lack of assistance at this juncture and risk being unable to derive the full benefit from the great systems in the post-war days.

The position of the British-owned railway companies in Argentina has been the cause of great anxiety to their proprietors for a good many years, and the smallness of the return on the large sums which have been invested in order to give the Argentine Republic the excellent railway system which is now provided by the British-owned lines is only too well known. During 1941 the amount of Argentine railway capital dealt in on the London Stock Exchange was £257,861,256, and the interest which was forthcoming was but £3,595,075, equal to 1.4 per cent. only; there was, indeed, no less than £177,671,819 of investment which received no interest. The amount quoted for the railways of Argentina showed a drop of £5,883,924, and the yield of 1.4 per cent. compared with 1.5 per cent. in 1940; the amount of capital receiving no interest increased by 20½ million pounds. The annual compilation which is undertaken by our contemporary *The South American Journal* shows that it is as long ago as 1931 since the capital invested has received interest averaging 3 per cent.

PUBLICATIONS RECEIVED

The First Passenger Railway (THE OYSTERMOUTH OR SWANSEA & MUMBLES LINE). By Charles E. Lee. London: The Railway Publishing Co. Ltd., 33, Tothill Street, Westminster, S.W.1. 8½ in. x 5½ in. 91 pp. Fully illustrated and indexed. Price 5s. net.—The following is the preface contributed by Mr. Sidney Garcke to this new publication of our associate, *The Railway Magazine*:—

"As Chairman of the South Wales Transport Company and of the Swansea Improvements & Tramways Company, and a Director of the latter since 1911, it has often been in my mind that it would be a matter of interest to record the facts relating to what locally is called simply the Mumbles Railway, but while I regret the lack of enterprise which has prevented the execution of the idea by myself I am delighted that the task has been so successfully accomplished by my friend Mr. Charles E. Lee, than whom

no more able an investigator could be desired.

"As a people we are strangely devoted to the old, historic or otherwise; and we take a pride in possession, say of a piece of furniture worn eaten and dilapidated to the point of uselessness in preference to a perfect reproduction, subject to the proviso that we must have expert assurance as to its genuine antiquity, in the absence of which our interest flags. The fact that the Mumbles Railway was really the first passenger line in the world will certainly increase the appreciation of the story expertly unfolded by the literary skill of Mr. Lee.

"To me, personally, the record is exceptionally attractive because of my long association with the Swansea street tramways, with which at one time a physical link with the railway was contemplated, though technical difficulties ensued, due

mainly to the fact that a bull-headed rail with a deep wheel flange was necessitated for the faster run out to the Mumbles, while in the streets of the town such a rail, though met with in other countries, would have been regarded as intolerable here. As recorded herein, the war of 1914 intervened before this and other problems relative to the physical junction could be disposed of. When it was possible again to take up this interesting proposal it had become apparent that the electric tramway itself might in course of time, and that not a very long one, give place to some more flexible form of transport—a prognostication which proved to be well founded, since in 1937 it was my rather melancholy duty to abandon the tramway system which my late father had with pride inaugurated by means of electric traction thirty-seven years before.

"For the student of rail transport, and particularly of railway history, this little book will prove of deep interest, and indeed all those for whom stories of any pioneer effort have an appeal will feel grateful to Mr. Lee for this excellent summary of an unique enterprise."—SIDNEY GARCKE.

THE SCRAP HEAP

In 1801
Wilberforce said: "I dare not marry,
the future is so unsettled."

In 1806
William Pitt said: "There is scarcely
anything round us but ruin and despair."

In 1848
Lord Shaftesbury said: "Nothing can
save the British Empire from shipwreck."

In 1849
Disraeli said: "In Industry, Commerce,
and Agriculture, there is no hope."

In 1852
The dying Duke of Wellington said: "I
thank God I shall be spared from seeing the
consummation of ruin that is gathering
about us."

In 1942
An Overseas Subscriber writes: "So,
after all, in 1942, I can still wish you a
'Happy New Year.'"

The Swedish National Art Gallery com-
missioned an agent to bid for a portrait of
James Watt by the Swedish artist von
Breda, but the limit imposed was too low;
the late Sir Nigel Gresley bought the por-
trait at 240 guineas for the Institution of
Mechanical Engineers.

EARLY FORMS OF SIGNALLING
"The Versailles & St. Cloud Railway
Company has just established a line of
signals from Paris to St. Cloud. They
are discs of about 2 ft. diameter, placed
upon movable pivots, and at night are
lighted with lanterns fixed in the centre."
From "The Railway Times" of January
6, 1841.

THE PENNSYLVANIA 6-4-6 LOCOMOTIVES IN SERVICE

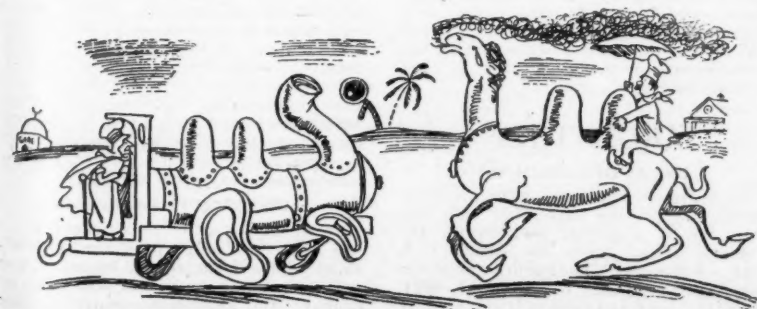
"The thrill of thrills, hold your breath,
heart be quiet, there she comes! Yes,
the great 6100, the famous S-1 which I
saw so many times at the New York
World's Fair. What an engine, what a
machine, what a tank—as big as a barn.
Am I lucky? I am to ride behind the S-1
and it won't be way back in the comfort-
able observation car; it will be in the
dirty old smoker, where I can hear it, and
smell it, and almost touch it. We leave
on time, but stop in the yards a minute or
two, which means we will have to put on
extra speed to make up. The thirteen cars
were child's play to the S-1. One of the
group of railroad men standing near her at
the plug said she is too big—on crossovers,

for example. 'She's all right,' another
said, nonchalantly, as though this was just
another engine.

"There are a lot of comments being
passed round about this history-making
locomotive—that it has been in the shop
a lot, that it is not doing so well, etc. A
man who is in a position to know told me
she is doing all right. Some of the 'gadgets'
had to be redesigned and they have had
some trouble with the links and the brake
shoes. Twenty-two cars are about all she
will handle, on a fast schedule run, but
twenty is no problem and she has done
better than 115 m.p.h. with eighteen. He
also said she rides as smoothly as a coach.
How I wished Charlie Chaney or somebody
who really knows something about engines
could have been there and talked with this
man."—From "A \$90 Vacation," by Arthur
T. Knowles, in "The Railroad Enthusiast,"
November-December, 1941.

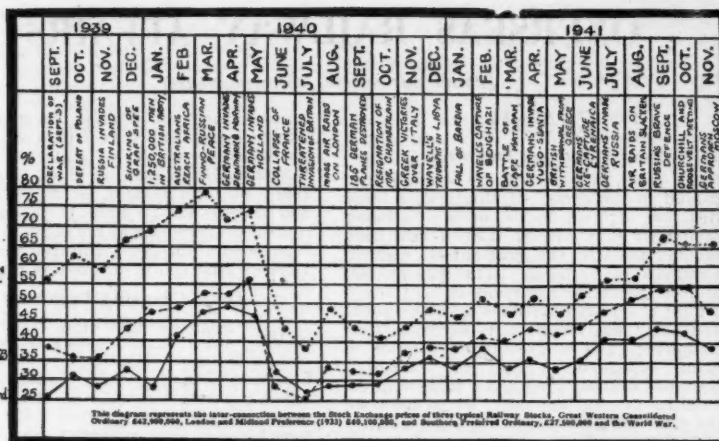
B.O.T. ENGLISH

A manufacturer of controlled goods who
has since the 31st day of July, 1940,
acquired any controlled goods from a manu-
facturer of controlled goods by virtue of the
provisions of this Order or an Order revoked
by this Order permitting the supply thereof
to a manufacturer, shall not use those
goods otherwise than in the manufacture of
controlled goods or supply those goods
otherwise than in the circumstances in
which he would be permitted to supply them
if he had carried out a process in the manu-
facture thereof.—Extract from *The Machin-
ery, Plant, and Appliances (Control) Order*,
1942, dated January 1, 1942, made by the
Board of Trade under Regulation 55 of the
Defence (General) Regulations, 1939.



Is the proposed Trans-Saharan railway but a dream?

[From the *Gazeta de Caminhos de Ferro*, Lisbon



The above graph appeared in the Decem-
ber issue of *The Railway Stockholder*. We
find it difficult to believe that the defeat
of Poland was directly responsible for a
rise in Southern preferred ordinary and
Great Western ordinary, that the German
invasion of Holland stimulated buying of
Southern preferred and L.M.S.R. 1923
preference, or that mass air raids on London
should have provoked a rise in the price of
all three stocks. The caption to the
diagram states that it "represents the
inter-connection between the Stock Ex-
change prices of three typical railway
stocks . . . and the world war."

There is a good story of a telegram
which was received at Nairobi from the
heroic babu in charge of the telegraph
office of some station down the line. It
ran: "Three lions on platform, station-
master in water tank, please wire instruc-
tions."—H. W. Tilman in "Snow on
the Equator."

Falling asleep on a night train from
Euston to Perth on December 17, Sir John
Barlow, of Bradwall Manor, Cheshire, had
passed his destination when awakened by a
ticket inspector near Wigan. He had
intended to change at Crewe for Manchester.
The next stop was Motherwell, near Glas-
gow, and Sir John, according to the prose-
cution at Preston, pulled the communica-
tion cord, although the ticket inspector and
the guard had warned him not to do so.
The train, it was stated, was brought to a
stop on a bend near Preston, and Sir John
got out. In restarting a coupling was
broken, and 56 minutes' delay resulted.
Sir John was fined £5 and £4 18s. costs.
On his behalf it was stated that he was
busily engaged on work of national import-
ance concerning rubber companies in the
Far East. He was tired out and his
business was urgent. He felt that in all
the circumstances his action was justified.
Imposing the fine, the magistrates said
they considered the case a bad one. There
might have been other important people
among the passengers who were incon-
venienced by the delay. If anybody was
permitted to pull up a train in that way
the railway system would be disorganised.

TRANSLATION OF A LINE IN AN UNSEEN VERSE PAPER

sanguinis auxiliis non eget illa
mei: which should be translated, "It does
not need the help of my offspring."

One interpretation was—
"He does not need my bloody
assistance."

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

CANADA

New Montreal Terminal

For years, marked only by a hole in the ground in the centre of Montreal, a large structure of brick and stone is now being completed that will be opened late next summer as one of the most modern railway terminals in Canada. The \$29,000,000 project, a modified version of Sir Henry Thornton's 1928 plan for a great terminal and hotel, has much of its external work completed, and work on the interior is being expedited so that the Canadian National Railways will have the use of its facilities by next autumn. From the time the plan was conceived, it has been a centre of controversy between those who favoured its execution and those who felt that it was unnecessary.

Approaches from the outskirts of the city will be completely electrified. Trains from the east, south, and west will travel from a new coach yard at Point St. Charles by an overhead viaduct, while those from the north will use the tunnel under Mount Royal through which a suburban service has been operated for years. Old Bonaventure Station will be retained as a freight terminal, while the new depot will handle passengers, baggage, express, and mail.

The terminal is close to both uptown and downtown districts. From the main entrance, a causeway passes under Dorchester Street, then rises to uptown level at Cathcart, a block from the busiest shopping section of St. Catherine Street. In the opposite direction, the causeway cuts down to LaGauchetière Street, a block from Victoria Square and the heart of the financial section.

The main entrance opens into a 300-ft. concourse in marble and terrazzo, the most impressive feature of the station. Underneath the concourse is the train level, while another storey down are rooms for handling baggage, express, and mail. Lifts, ramps, and chutes connect the various levels.

Executive and administrative offices are located above the concourse, and will provide for a grouping of railway office workers now scattered throughout the city. The space under the viaduct is already in use for office purposes.

Apart from its size, the terminal is modest in its external appearance. The walls are of terra cotta brick, relieved near the top of each side by blocks of white stone on which will be carvings representing the various methods of transport.

UNITED STATES

Winter Sports Trains

The extent of winter sports activities in the Eastern States is indicated by the fact that from January 9 the New York, New Haven & Hartford RR. began its eighth successive winter sports season with four special week-end services, which will continue to run for some months. On Friday evenings the Ski Meister leaves New York at 8.40 p.m. for St. Alban's, Vermont, running through over the Boston & Maine and Central Vermont lines, and 5 min. later the Eastern Slope Express starts for North Conway, Plymouth, and other points in New Hampshire; both these trains are due back in New York on the next Monday morning, giving two complete days for sport; 10-day round trip tickets are also

issued. Then on Sunday mornings the Snow Clipper leaves at 7.10 a.m. for the special snow station of Pittsfield, in the Berkshire Hills, and the Snow Express at 7.20 a.m. for Pittsfield, Great Barrington, and South Lee; both these expresses return to New York the same evening. Last season the New Haven catered for 12,000 winter sports devotees in this way.

Level Crossing Fatalities

A sharp rise has taken place during 1941 in the total of level crossing fatalities, as compared with 1940. The Bureau of Statistics of the Interstate Commerce Commission points out that in the first ten months of 1941 no fewer than 1,520 persons were killed in level crossing accidents, compared with 1,412 in 1940; and that in the same period 3,725 persons were injured, compared with 3,486 in the previous year. In the month of October alone 183 persons lost their lives in crossing accidents, an increase of 15 over the corresponding month in 1940.

New Haven—Old Colony Merger

Judge Carroll C. Hincks, of the Federal District Court at New Haven, Conn., has disapproved the proposal of the New York New Haven & Hartford RR. for a mandatory merger with the Old Colony RR., with the comment that he would consider a management improvident that was prepared to pay \$12,000,000 for a property that is producing an annual deficit of upwards of \$600,000, notwithstanding the considerable reductions in passenger service that have been made over the Old Colony lines. The basis of the decision is that the proposal imposes an involuntary merger on both parties, makes no provision for eliminating the Old Colony deficit, discriminates against secured creditors of the New Haven, and, as just stated, that it is financially unsound. The decision also follows a previous disapproval of the New Haven plans in regard to the bonds of the Housatonic, Central New England, Boston & Providence, and other railroads and associated companies, and an amended reorganisation scheme is called for.

Railway Staffs

In November, 1941, Class I railways of the United States employed a total of 1,202,006 persons, an increase of 15.2 per cent. over the corresponding month in 1940. Of this total 4.8 per cent. were executives, officials, and staff assistants; 10.3 per cent. were professional, clerical, and general; 22.3 per cent. were engaged on the maintenance of way and structures; 16.1 per cent. on the maintenance of equipment and stores; and transportation occupied 46.5 per cent., of whom 12.4 per cent. were engaged as yardmasters, switchtenders, and in engine and car sheds, and 15.4 per cent. in train and engine service.

ARGENTINA

Use of Brazilian Coal

The use of Brazilian coal on the Argentine railways is proving successful, and may prove to be a partial solution for the problems arising from the difficulty in getting Welsh coal. The quantity imported from Brazil from May to November, 1941, was 42,000 tons, and most of it was used by the Central Argentine, Entre Rios, and Southern Railway Companies. The San Fernando power station, which feeds the

electrified system of the Central Argentine, has been using a mixture of 50 per cent. Argentine and 50 per cent. Brazilian coal, with good results. Experiments at San Fernando have shown that Argentine coal alone (which comes from the province of Mendoza) is not satisfactory; nor does it mix well with Welsh or North American coal. It does, however, give good results when mixed with Brazilian. The fuel position in Argentina was described in *The Railway Gazette* of December 19 and 26, 1941, at page 648.

CEYLON

Closing the Bangadeniya-Puttalam Line

The Executive Committee of Communications & Works, as a result of a conference following an application from the General Manager of Railways for the closing down of the Chilaw to Puttalam line, has decided to recommend to the State Council that the line should be closed from Bangadeniya to Puttalam only. During the last financial year the deficit on the working of the last-named section amounted to Rs. 26,972, and an annual saving of Rs. 25,140 is estimated on the working of the line north of Chilaw if this closure is effected. The principal place affected is Battuluoya, but as this is only 5 miles from Bangadeniya, it is expected that traffic to and from the former station will be diverted to the latter with little loss. The carriage of Government salt is the principal traffic between Chilaw and Bangadeniya; of the remainder of the route the local inhabitants have made little use during a four-year trial period.

Colombo Water Supply

As a measure of economy, the Treasury has instructed the railway authorities to make the maximum possible use of sources of locomotive water supply outside Colombo, instead of the city supply. The Colombo Municipal Council has consistently refused to consider the railways as anything other than a trading concern run for profit, and in the absence of any concession, locomotive water at normal trade rates has been a costly item. It is suggested that the railways should sink more wells at outlying stations, and also take water from adjacent streams where it is of suitable quality. Meantime, the supply of drinking water sent from Colombo to inland stations for the use of the railway staff has been curtailed.

Withdrawing Night Watchmen

The shortage of brass and other metals due to war conditions has caused an increase in the theft nuisance in Ceylon, particularly at terminal and other stations where numbers of carriages are stored; these suffer by the loss of their fittings, and the trouble is accentuated by the difficulty in obtaining replacements. It will also not be lessened by the decision of the railways, in pursuance of their policy of retrenchment, to withdraw a number of night watchmen at stations, thereby throwing more responsibility on to the station staffs. Instructions have been given for the more careful storage of railway property, such as signal lamps, and for the padlocking of wagons in railway yards at night.

Checking Ticket Frauds

In an endeavour to check ticket frauds it has been decided to prosecute, not only those who sell the return halves of their tickets, but also the buyers, when they are caught; the maximum penalty in either case has been fixed at Rs. 100. At one period this traffic in tickets was increasing at such a rate that the issue of return tickets

at reduced fares was suspended, and even subordinate railway officials were found guilty of conducting illicit agencies for this purpose. It is now made a penal offence for the user to sell either half of a return ticket.

GERMANY

The Reichsbahn in 1941

A preliminary survey of the earnings of the German State Railway was published at page 115 of our January 23 issue. It now appears that the ratio of increase in gross receipts from passenger and goods traffic, totalling about Rm.9,000,000,000 for 1941, is appreciably lower than in 1940, although higher than in preceding years, as shown by the following figures:—

Year	Gross receipts in million Rm.	Percentage increase compared with preceding year
1938	5,100	16
1939	5,800	14
1940	7,600	31
1941	9,000	18

This comparatively smaller increase is attributed to the fact that 1940 was the first full war year, and so carried the brunt of the additional military and supply transport. The increase is also accounted for partly by the incorporation into the Reichsbahn system of railway systems in the West and in the East, the Reichsbahn report briefly mentioning an additional extension of the Reichsbahn system "mainly in the south-east and the taking over of a further series of private railways." The report, however, is silent as to the incidence in the traffic performance and receipts of the Reichsbahn brought about by the conversion to the European standard gauge (4 ft. 8½ in.) of certain long-distance broad-gauge (5 ft.) lines in the occupied Soviet regions, and by the allocation of the Reichsbahn rolling stock to the lines so converted.

Goods-train-kilometres which had increased by 15 per cent. in 1940 as compared with 1938 were higher by 32 per cent. (It is not stated whether this percentage refers to the 1938 or to the 1940 level). The volume of goods carried in 1941 exceeded the 1938 volume by 76 per cent., and the average weight of goods trains increased from 641 tonnes in 1938 to 709 tonnes in 1940 and to 715 tonnes in 1941. The potato traffic alone required a number of wagons which in 1941 exceeded by about 18 per cent. those used for this traffic in 1940 and was double the number of wagons used for the same purpose in 1938. Traffic in the occupied eastern countries or provinces absorbed about one-tenth of the total of goods wagons available.

So far as the financial results are concerned, the report stresses the point that "due to the increased field of activity and increased traffic performance, the financial outlay, too, shows an increase as compared with 1940." As to the higher allocation to the Treasury (mentioned in our notes of January 23), it is recalled that such allocation totalled Rm.220,000,000 in 1940 (including Rm.120,000,000 which has to be transferred as a fixed annual contribution in accordance with the provision of the Reichsbahn law), while, according to a statement in the report, the "allocation for 1941 will be increased appreciably."

Financial Results of "Westwaggon"

Westdeutsche Waggonfabriken A.G. (Westwaggon), Germany's most important wagon building concern, has returned a net profit for the year ended June 30, 1941, of Reichmark 692,583, as compared with Rm. 507,647 a year previously. As was

recorded at page 106 of our issue of January 16, when details were given of several German wagon-building companies, the net profit enabled the company to pay a dividend of 6 per cent. on its share capital of Rm. 11,000,000, as against 5 per cent. for the previous financial year, when payment of dividends was resumed after an interval of nine dividendless years. Gross profit amounted to Rm. 16,900,000 (Rm. 14,280,000 for the preceding year) and extraordinary income at Rm. 2,560,000 showed an outstanding increase as compared with Rm. 360,000 a year previously. This increase is due to the sale of the company's participation in Waggonfabrik H. Fuchs of Heidelberg to Dillingen Siderurgical Works of Dillingen (Sarre) (Dillinger Hüttenwerke). Taxation increased from Rm. 1,890,000 to Rm. 3,780,000 for the year under review, as against Rm. 890,000 for the year ended June 30, 1939. Wages, salaries and welfare expenditure was Rm. 11,660,000 against Rm. 10,320,000 for the preceding year. The company emphasises that the adoption of the continuous belt assembly method greatly increased the output of the two works as far as goods vehicles for the Reichsbahn are concerned. Production was also eased by the reduction of the number of types.

Wagon Builders Association

After a meeting of the German Wagon Builders Association (*Deutsche Waggonbauvereinigung*, of Berlin) at Vienna on December 12, a number of wagon works of the Sudeten province, of Bohemia-Moravia, of Austria, and of Danzig joined the association. The name of the association has been changed to "Community of Greater German Wagon Works" (*Gemeinschaft Grossdeutscher Waggonfabriken*).

ITALY

The State Railways

The traffic performance of the Italian State Railways in 1941 exceeded by far any previous results ever attained, according to a recent official statement. The surplus for the first eight months of the financial year 1940-41 (beginning on July 1, 1940) is expected to prove considerably greater than any surplus attained during the same period of previous financial years.

The number of passengers conveyed increased from 108,000,000 in 1938-39 to 122,000,000 in 1939-40, as against an average of 80,000,000 in previous financial years; the total of passenger-kilometres correspondingly increased from 11,733,000,000 to 13,546,000,000 for 1930-40. Passenger receipts increased from lire 1,577,000,000 in 1938-39 to lire 1,893,000,000 in 1938-40, as compared with an annual average of lire 1,150,000,000 in previous periods. Augmented passenger receipts are affected by a 20 per cent. increase in passenger fares, but are said to be due mainly to expansion of traffic.

The goods traffic curve has risen from 35,000,000 metric tons in the financial year 1932-33 to 47,000,000 metric tons in 1938-39, and 59,000,000 metric tons in 1939-40; *tonne-kilometres* totalling 11,700,000,000 in 1938-39 went up to 15,032,000,000 in 1939-40, while goods receipts aggregated lire 3,285,000,000 in 1939-40, against an annual average of lire 1,800,000,000 in previous years. The increase of the goods traffic is due to a great extent to the expansion of the coal traffic from Germany, imports from that country amounting to about 12,000,000 metric tons a year. Other factors accounting for the increase of the goods traffic are

the intensified exploitation of home resources in connection with the war effort, and the reduction (and later the virtual suspension) of maritime traffic.

The ability of the State Railways to cope with the considerably increased traffic is the result largely of the electrification of a considerable portion of the system. The route length of the State electrified system totalled 5,173 km. (3,214 miles) on June 30, 1940, against 4,856 km. (3,017 miles) a year previously. The State Railways have been able to reduce their coal consumption by about 50 per cent. since 1933; 33 power stations, totalling 521,860 kW (including 7 railway-owned ones aggregating about 140,000 kW) secure the supply of the energy required by the electrified State system.

SWITZERLAND

Private Railway Amalgamation

On January 1 three private railway companies, namely, the Rhätian, the Chur-Arosa, and the Bellinzona-Mesocco Railways, operating metre-gauge systems in the Eastern part of Switzerland, were amalgamated. The head offices of the combined systems will be at Chur, where the headquarters of the Rhätian Railway (Rhätische Bahn), the largest of the three, are established at present. On the same date, the operation of the Bernina Railway, a metre-gauge railway extending from St. Moritz, via Pontresina, through the Bernina Pass at Campolodgno, crossing the Italian frontier, to Tirano, 2 miles beyond the border, was taken over by the Rhätian Railway; the Bernina Railway Company retains its independent existence.

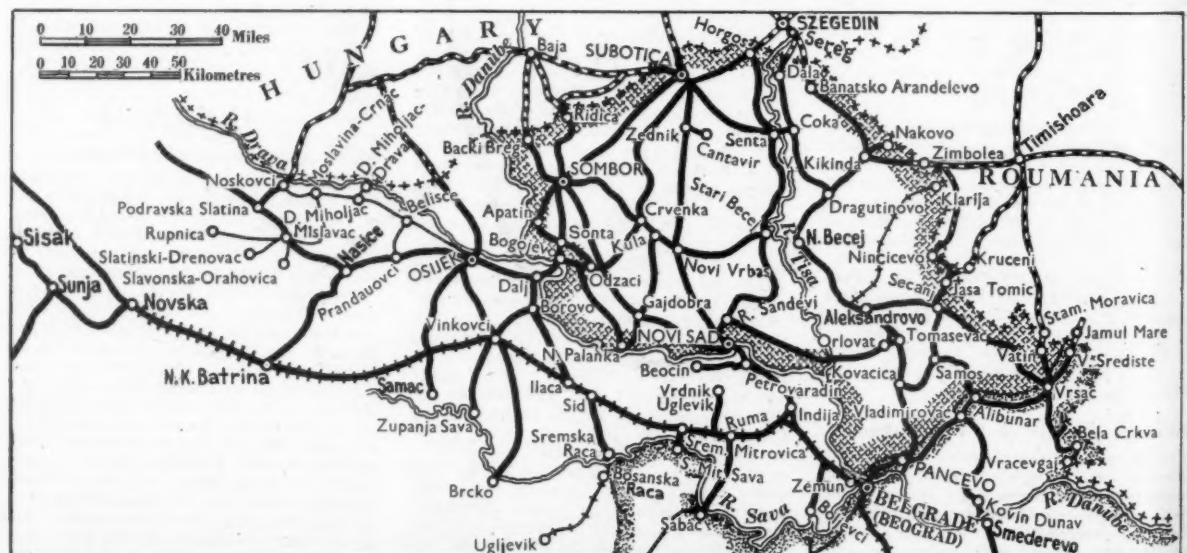
All these lines are electrified. The Rhätian Railway has a main line from Landquart on the Swiss Federal Railways line from Zurich to Chur, via Chur, Reichenau, Filisur, Bevers, and Samaden, to St. Moritz, 103 km. (64 miles); another main line between Landquart and Filisur, via Davos, 70 km. (43 miles); and branch lines from Reichenau to Disentis, 50 km. (31 miles); from Bevers to Schuls, 50 km. (31 miles); and from Samaden to Pontresina, 6 km. (3½ miles); making a total length of 279 km. (173 miles). With the addition of the Chur-Arosa line, 26 km. (16 miles), and the Bellinzona-Mesocco line, 32 km. (20 miles), the new system comprises 337 km. (209 miles). The Bernina line now operated by the new Swiss company is 61 km. (38 miles) in length.

The railway map of Switzerland published in THE RAILWAY GAZETTE of June 7, 1940, page 813, shows the whole system.

HOLLAND

Accident near the Hague

A serious railway accident occurred at 7.30 a.m. on January 26, a few yards east of the bridge across the Merwede Canal, near Utrecht, in the main line from the Hague. The German express from the Hague to Berlin ran into the rear of an electric train from the Hague. Due to severe weather conditions, the local train was running ½ hr. late and stopped at the Merwede Canal signal box for a reason not stated. The express ran at full speed into the rear of the standing train, telescoped the last coach, and derailed and overturned the second coach from the rear, which then fell down the 20 ft. embankment. Few passengers were travelling in the electric train; 2 were killed and 10 seriously injured. Lock and block working is in operation on that particular section. The line is on an up gradient of 1 in 200.



THE DISMEMBERMENT OF JUGOSLAVIA

Serbia represents the remnant of the Kingdom of Yugoslavia, the main portion of which has been converted into the puppet Axis States of Croatia and Montenegro or annexed by Germany, Italy, Hungary, Bulgaria, and Albania

ONE of the most drastic dismemberments of territories as a result of Axis invasion has occurred in the case of the Kingdom of Yugoslavia, which approximately (but by no means precisely) has been divided into its constituent parts. Yugoslavia is based upon the old Kingdom of Serbia, the independence (from Turkey) of which was established by the Treaty of Berlin in 1878; it became a kingdom on March 6, 1882. Towards the end of the war of 1914-1919, after the revolution in Austria-Hungary, various parts of that empire declared their independence, including Slovenia, Croatia, Dalmatia, and Bosnia. The union with Serbia (together with that of Montenegro, which had been voted on November 25, 1918) was proclaimed on December 1, 1918, when the official name of the state was announced as being the Kingdom of the Serbs, Croats, and Slovenes. By the Treaty of Rapallo the boundaries of the new state adjacent to Italy were determined, excepting as regards Fiume. In respect of this important port, an agreement was reached in January, 1924, when Fiume was awarded to Italy and Barosh to Yugoslavia. In December, 1923, Yugoslavia obtained from Greece a free zone in the harbour of Salonika. By a law of October 3, 1929, the name of the State was changed officially to the Kingdom of Yugoslavia, by which already it was generally known.

The Kingdom of Yugoslavia can be said to have inherited five distinct railway systems after the war of 1914-1919. Six standard-gauge lines passed through Slovenia, Croatia, and Volvodina, connecting the Austrian and Hungarian capitals with the Adriatic coast at Fiume and Trieste. The break up of the old empire and the ceding of the two ports to Italy destroyed the former strategic value of these lines. A distinct system of narrow-gauge lines existed in Bosnia, Herzegovina, and South Dalmatia. This was connected with the first-mentioned system of standard-gauge lines at two points only—Prijedor and Brod. Since January, 1925, it has also been connected with the narrow-gauge system of Northern Serbia by means of a line from Visegrad to Uzice. Serbia had 1,189 km. (739 miles) of 4 ft. 8½ in. gauge line, 839 km. (521 miles) of 2 ft. 6 in., and 546 km. (340 miles) built to the 2 ft. gauge. At the close of the war the entire Serbian system was practically destroyed; bridges, tunnels, and stations had been blown up, and of rolling stock there remained but six locomotives and 200 vehicles. Working order was restored by July, 1919. At the time of the German invasion on April 6, 1941, the Yugoslav railways comprised, with new construction, about 10,335 km. (6,422 miles) with 80,000 staff. Of the total mileage, 7,304 km. (4,539 miles) were of standard 4 ft. 8½ in. gauge, and 3,031 km. (1,883 miles) of narrow gauges, namely, metre, 76 cm. (2 ft. 6 in.), and 60 cm. (2 ft.). With the exception of 874 km. (543 miles) all the railway lines were under State administration. The State Railways were attached to the Ministry of Communications and managed by a general administration at Belgrade, with eight departments and five divisional managements at Belgrade, Zagreb, Ljubljana, Sarajevo, and Subotica, with a manager to each. The standard-gauge rolling stock consisted of 1,681 locomotives, 4,149 carriages, 45,889 wagons, 6 petrol railcars, 3 diesel railcars, and 3 diesel-electric railcars. For the 76 cm. and 60 cm. lines there were 728 locomotives, 959 carriages, and 11,995 wagons (including stock of private lines worked by the State). The State administration had introduced railcar operation on the narrow-gauge mountain lines between Belgrade and the Adriatic across former Bosnia-Herzegovina, and was studying the question of electrifying certain lines in the north of the country.

It may be recalled that uncertainty as to the relationship between Yugoslavia and Germany culminated in the signature

in Vienna on March 25 of last year (by the then Prime Minister, and the Foreign Minister of Yugoslavia) of a protocol to the Tripartite Pact signed in Berlin between Germany, Italy, and Japan, on September 27, 1940. Public opinion in Yugoslavia, however, which had been strongly opposed to alignment with the Axis powers while the Pact was in contemplation, resulted in widespread demonstrations of protest immediately the signing became known. On March 27 the Yugoslav Armed Forces deposed Prince Paul, the senior Regent, and all members of the Yugoslav Government, and proclaimed the assumption to power of King Peter (who was due to come of age on his 18th birthday in September last). During these fateful days railway communication between Yugoslavia and Roumania was suspended on March 27, and the whole of that frontier closed by the Yugoslav Government on March 31. On March 27, also, railway traffic between Yugoslavia and German-Austria was severely restricted, and on March 30 that frontier was closed entirely by the Yugoslav authorities. Railway communication between Yugoslavia and Bulgaria was suspended on March 28, and the complete closure of the frontier between Yugoslavia and Hungary occurred on April 4, leaving open to rail traffic only the frontier between Yugoslavia and Greece.

Invasion and Partition

On April 4 it was officially announced in Belgrade that passenger trains throughout Yugoslavia would be cancelled indefinitely as from midnight April 5/6, to leave the lines clear for military traffic, and general resumption throughout the country has not yet taken place. It was believed that this limitation to traffic would also prevent the movement of goods, including oil, into Germany and Italy. In the early hours of April 6 (Palm Sunday) Germany invaded both Yugoslavia and Greece, and Italy, Hungary, and Bulgaria entered various parts. Belgrade was declared an open city, but was nevertheless subjected to intensive German air attack, and its rail communications were reported to be damaged severely. The Germans occupied Belgrade on or about April 10, and it is stated that rail communications were re-established on April 11 between Belgrade and the Danube port of Novi Sad (about 50 miles to the north, on the main line to Budapest), and between Belgrade and Mlade Novac (some 40 miles to the south, on the main line to Nish and Sofia).

Jugoslav armed forces were compelled to capitulate on April 17, and in most parts of the country military occupation was virtually complete two days later. Within a few days it appeared that Yugoslav territory was in process of dismemberment, and a Rome decree of May 3 announced that Italy had annexed Ljubljana (Laibach), the capital of Slovenia. Rail communications between Slovenia and Trieste were resumed on April 26, according to an announcement by the Civil Commissioner for Italian-occupied Yugoslavia. Motor traffic in both directions between Trieste and Ljubljana, and between Gorizia and Ljubljana, was restored on April 27. Rail traffic between Trieste and Ljubljana was resumed on June 26, after three viaducts dynamited by the Yugoslav Forces had been repaired. Hungary occupied part of Croatia in the north-east of Yugoslavia, and a pro-German party set up a new independent republic in Croatia, but complained of the acquisitions of Italy and Hungary as being contrary to a German promise that Croatia should remain intact. Nevertheless, it seems that an agreement was signed on May 13 between Germany and Croatia defining the new frontiers between the two States. The parts of Slovenia around Maribor (Marburg) bordering on Austria have been annexed by Germany. The Hungarian seizures of Yugoslav territory on April 11 (Good Friday) are understood to have

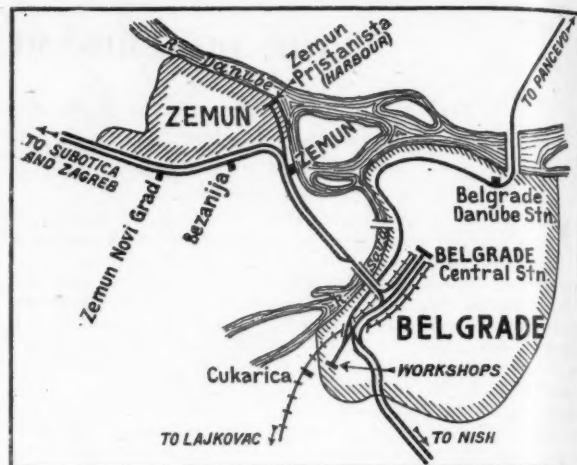
comprised the regions known as the Banat of Batchka and Baranya, including the towns of Subotica and Novi Sad. This area is bounded by the River Danube and (on the north) by the former Hungarian frontier. It was announced in December that the Hungarian State Railways had established a divisional headquarters at Novi Sad (now renamed Ujvidek) for working the acquired railways. On July 9 the Hungarian Army took over the River Mura area (in the corner where Austria, Yugoslavia, and Hungary had met).

Montenegro seems to have been established as a separate State, with boundaries fairly closely approximating to those which applied before the outbreak of war in 1914. Bulgaria occupied Serbian-Macedonia, and Albania (of course, a puppet State of Italy) was given a strip of territory between Struga and Ohrid in the south, and Tetovo in the north. This territory includes a railway of 60 cm. (2 ft.) gauge, which is actually the first railway ever to come under the control of Albania. Bulgaria is given a common frontier with Albania by occupying a slice of territory around Skopje (Uskub), and extending from a boundary (not clearly defined) south of Nish right down to the frontier of Greece.

The Province of Croatia was proclaimed a Kingdom at Zagreb, its capital, on May 15, and it was then stated that the agreement between Croatia and Germany had defined the frontier between the two States as along the line of the old border between Croatia and the former Austro-Hungarian provinces of Carinthia and Styria. On May 18, King Victor Emmanuel of Italy selected his cousin, the Duke of Spoleto, to be King of this puppet Axis State of Croatia.

The Croatian State Railways

According to news from Zagreb, the railway system of Croatia comprises a route length of 4,625 km. (2,874 miles), including 386 km. (240 miles) of State-owned forest railways, and 189 km. (117 miles) of private railways. Both the State-owned forest lines and the private railways are under the Ministry of Transport & Public Works. Apart from these two groups, the route length of the standard-gauge lines is 2,800 km. (1,739 miles), that of the narrow-gauge lines totals 1,250 km. (776 miles). The State railway system was formerly under four regional managements of the Yugoslav State Railways, i.e. Belgrade North, Belgrade South, Sarajevo, and Zagreb. The headquarters of the new administration are at Zagreb, and there are two regional managements, one at Zagreb and the other at Sarajevo. The latter deals with the extensive system of 76 cm. (2 ft. 6 in.) gauge lines in what, prior to the dismemberment of Yugoslavia, were known as the Drinska Banovina, Vrbaska Banovina, and Zetska Banovina (ex-Bosnia and Herzegovina). No autonomous financial administration has been set up for the Croatian State Railways, and their budget forms part of the general budget of the country. The Croatian budget for 1942 envisages combined gross receipts amounting to Kuna 3,120,000,000 accruing from the operation of railway, postal, and telegraph services, while the total expenditure for the three is estimated at Kuna 3,140,000,000. The bridge over the River Sava



between Belgrade and Zemun (Zimony) was reopened after repair on June 12; this is a section of the main line from Belgrade to Zagreb. Gradual restoration of services in the north of Croatia was recorded at page 393 of our October 17 issue. An ambitious programme of new lines, double tracking, realignment and strengthening of existing railways, and of main-line electrification, was announced last year (and recorded at page 266 of our September 12 issue).

The Railways of Montenegro

Within the frontiers of Montenegro there are only isolated sections of railway. This State has a short coast line including the port of Bar, which is connected by a 41-km. (25-mile) private narrow-gauge railway with Virpazar, whence a mountain road leads to Cetinje, the capital. An isolated section of Government railway links Podgorica with Plavnica, 21 km. (13 miles). These railways are both of 2 ft. 6 in. gauge. Pec, the present terminus of the standard-gauge line from Pristina, is 35 km. (22 miles) inside the Montenegrin frontier. The 71-km. (44-mile) extension from Bileca to Niksic, opened in 1939, of the 2 ft. 6 in. gauge line from Dubrovnik is in Montenegro. There would thus appear to be about 104 miles of railway in the new State.

The Bulgarian-Occupied Zone

Almost as soon as Bulgaria had taken over the Skopje territory, two new connecting railways were planned, and work on both was begun in June. Both are standard-gauge lines, one from Gueshevo to Kumanovo, providing a direct route between Sofia and Skopje; and the other from Gorna Djumaja (the break-of-gauge station on the Struma Valley line) to Kocane, the terminus of a branch from Veles. It is reported that large numbers of men have been allocated to the work to expedite construction (see our issue of July 25, 1941, page 96).

Serbian State Railways

All that is left of the Yugoslav State Railways is in the territory of the old Kingdom of Serbia, and here a Serbian State Railways administration has been established to operate a system of about 1,697 km. (1,060 miles) of standard-gauge line, and 702 km. (433 miles) of narrow-gauge line.

Frontier Stations

In many parts the new frontiers still seem to be but vaguely defined, and frontier stations have already been changed on more than one occasion. References to these have been made in our issues of August 15 (page 175), October 17 (page 393), and November 7 (page 482).



THE APPLICATION OF BEARING SPRINGS TO LOCOMOTIVES AND OTHER RAIL UNITS

Design, maintenance, and characteristics of suspension systems commonly applied to locomotives and rolling stock

By GEORGE W. McARD

THE addition of springs to any rail unit aims at :—

1. Reducing or eliminating from the vehicle structure the shock effect from the track, so lengthening the life of the unit.
2. Minimising wear of the track.
3. In passenger vehicles especially, promoting higher speed and passenger comfort.

The subject justifies the most careful study if the design is to be successful, and as unsuitable springs may lead to certain features, such as pitching and rolling, which are both dangerous and objectionable, the design of springing is of greater importance than at times seems to have been appreciated.

An examination of any modern road vehicle will show three components the combined functions of which serve to one end, *viz.*, the isolation of the body and framing of the vehicle, whether for the transport of goods or passengers, from the shocks inevitably transmitted when travelling at speed. These are the main bearing springs and their auxiliaries, and the tyres. The first are very skilfully designed, and assisted, on the heavier vehicles, by fluid shock absorbers as well as the cushioning effect of large capacity pneumatic tyres. Even the lighter vehicles all have some form of shock absorber or damping device, and, while the results often leave much to be desired, the reason is probably almost solely that the springs must be designed to cover, not a fixed load or one which varies within narrow limits, but a load which is free to fluctuate between fairly wide extremes. This is confirmed by the springing of a high-grade private car, where the variation in load is relatively much smaller and the riding appreciably smoother.

Applying the foregoing to locomotives, we usually find only one component provided, namely the main bearing spring. On a comparatively few engines auxiliary damping springs are included—always with marked advantage to the riding—but the majority of engines have no such luxury, and even those which have are restricted to the helical steel spring, or the rubber unit (Spencer Moulton type) working within a protecting case. Coaching stock, however, is almost universally equipped with some form of auxiliary spring, though not of the road vehicle pattern, and so far as the writer knows, no rail unit yet has the advantage which the fluid shock absorber affords.

Tyres for rail vehicles being necessarily of steel—eliminating from the present review such special vehicles as the Michelin railcars—are, for all practical purposes, non-resilient, and even the Lang wheel as used so largely on coaching stock hitherto, cannot be regarded in the same light as a pneumatic tyre wheel. Experiments have been in progress for years to introduce some cushioning effect in the wheels of rail units, and although some success has been achieved in a few cases, the universal application of this additional form of shock absorber appears still to be a thing of the remote future.

In the matter of bearing springs the rail passenger vehicle has the advantage of a large span, over and above the benefit gained from its auxiliaries, and the further gain due to the use of a fixed constant in its load formula; this is used by all coach builders and is therefore common to this class of spring. It scores still further in that the bogies have additional springs included in their assembly—bolster springs—and where all these are determined with meticulous care and based on past running experience the result can be remarkably free from shocks. Were it possible to eliminate the rail joint, by welding or other means, one might credit a modern coach with being in its make-up almost—though not altogether—the last word in comfort. To this end, naturally, the upholstery assists very largely, as also do the rubber insulating blocks fitted between the body and the framing.

But the locomotive is in a different category—solid frame

construction, steel tyres, bearing springs of comparatively short span, and, usually, no auxiliaries. The springs are not always designed as carefully as they should be, and the constant employed in their load formula may be anywhere between 12 and 17. In a new design the utmost care should be taken to ensure that the load the springs are designed to carry will be as close as possible to the as-built load eventually sustained, and the British Standards Committee should call for the use of a definite constant for the designing formula instead of allowing designers to use such widely varying values. A further difficulty is occasionally introduced when the springs of an existing design are to be repeated in a new vehicle, even though by no means quite the ideal spring for the job. This, without doubt, is natural from the railway stores department's point of view, but by far the better plan is to standardise spring plate sections, and stock these in suitable lengths for repairs, with finished spring units kept to a minimum.

Spring Formulae and Service

Although this article is not intended to deal with the details of spring design, it may be an advantage briefly to repeat herewith the various formulae which are in regular use among different builders, and these are therefore stated below, in some cases in a new form. (Explanatory notes *re* symbols follow formulae.)

$$\text{Safe working load} = Bt^3 N/KL \dots\dots\dots (1)$$

Where plates of different thicknesses are to be employed, the numerator of the above formula should include the square of each thickness (*t*) times the number of plates of that thickness, *i.e.*, $B(t^2 N + t_1^2 N_1 + t_2^2 N_2 \text{ etc.})/KL$

$$\text{Deflection per ton} = 0.1 L^3/Bt^3 N \dots\dots\dots (2)$$

$$\text{B.S.S. test deflection} = L^3/900 T \dots\dots\dots (3)$$

$$\text{B.S.S. test load} = (3)/(2) = 45.5 BT^3 N/L \dots\dots\dots (4)$$

$$\text{Safety factor} = (4)/(1) = 0.178 K \dots\dots\dots (5)$$

$$\text{Stress (static)} = 68.5/(5) = 384.8/K \dots\dots\dots (6)$$

$$\text{Deflection (static)} = (1) \times (2) = 0.1 L^3/Kt \dots\dots\dots (7)$$

$$\text{Periodicity per min.} = \sqrt{35,000/(7)} = \sqrt{350,000 K/L^3} \dots\dots\dots (8)$$

$$\text{Complete oscillation} = 0.32\sqrt{(7)} = 0.32\sqrt{0.1 L^3/Kt} \dots\dots\dots (9)$$

Symbols for Above Formulae

B = width of spring plate in inches.

T = thickness of spring plate in decimals of an inch.

t = thickness of spring plate in sixteenths of an inch = 16 T.

L = spring span, or centres, in inches.

N = number of plates in spring.

K = a constant—for carriages = 11.3.

for locomotives = 15 (recommended), or 12 to 17

in general use.

For the graphical determination of laminated springs, a useful method was described in *The Railway Engineer* of January, 1927, pages 34 and 35, and similar treatment for helical springs was given in the issue of that journal for the following month, pages 63 to 65, inclusive.

Of the springs now in service the following summarises the position today for locomotive and passenger stock :—

Locomotives

coupled and drivers—laminated or helical.
bogies and trucks—laminated or helical.
tenders—laminated only.

Coaching Stock

main bearing springs—laminated or helical.
bolster springs—laminated, helical or volute.

Special springs, such as the Timmis, are also used for both classes of vehicles, but these are invariably settled by consultation with the spring makers.

Laminated springs always produce considerable friction due to the movement of the plates relative to one another, even when in good condition, though this is not long maintained unless they are underhung and therefore in a position to catch much of the lubricant that escapes from the axlebox.

SPRING No.	DESCRIPTION	RAILWAY	NUMBER OF PLATES	PLATE		SPRING SPAN INCHES	ACTUAL LOAD TONS	CALCULATED SAFE LOAD TONS	DEFLECTION PER TON INCHES	B.S.S. TEST		SAFETY FACTOR	STRESS (STATIC) TONS	DEFLECTION (STATIC) INCHES	PERIODICITY PER MIN.	COMPLETE OSCILLATION
				THICKNESS INCH	WIDTH INCHES					DEFLECTION INCHES	LOAD TONS					
1	MAIN LINE LOCOMOTIVE—DRIVERS	HOME	11	$\frac{9}{16}$	$4\frac{1}{2}$	42	6.33	6.36	.205	3.483	16.95	2.67	25.6	1.304	164	.365
2	" " — TRUCK	"	12	$\frac{7}{16}$	4	32	5.00	4.9	.199	2.601	13.06	"	"	.975	189	.317
3	HEAVY SHUNTING LOCOMOTIVE	"	12	$\frac{9}{16}$	$4\frac{1}{2}$	39	7.00	7.47	.1508	3.004	19.923	"	"	1.126	176	.341
4	LIGHT " "	FOREIGN	12	$\frac{7}{16}$	4	33	4.25	4.75	.218	2.766	12.67	"	"	1.036	184	.326
5	DIESEL POWER HOUSE—MOTOR BOGIE	"	10	$\frac{5}{8}$	$4\frac{1}{2}$	42	7.05	7.67	.223	3.45	15.404	2.01	34.08	1.71	142	.422
6	" " — " "	"	12	$\frac{1}{2}$	4	48	5.4	5.66	.45	5.12	11.375	"	"	2.55	117	.513
7	" RAILCOACH — " "	HOME	11	$\frac{1}{2}$	5	45	7.0	6.92	.323	4.5	13.932	"	"	2.23	125	.48
8	" " — " "	FOREIGN	10	$\frac{1}{2}$	4	48	4.03	4.72	.54	5.12	9.481	"	"	2.55	117	.513
9	" CARRYING " "	HOME	10	$\frac{7}{16}$	$4\frac{1}{2}$	48	4.07	4.065	.716	5.85	8.176	"	"	2.91	110	.546
10	" RAILBUS — BOTH BOGIES	"	6	$\frac{1}{2}$	$3\frac{1}{2}$	48	2.3	2.478	1.029	5.12	4.978	"	"	2.55	117	.513
11	" " — DRIVING BOGIE	FOREIGN	8	$\frac{3}{8}$	$2\frac{1}{2}$	30	1.9	2.124	.625	2.66	4.266	"	"	1.327	162	.37

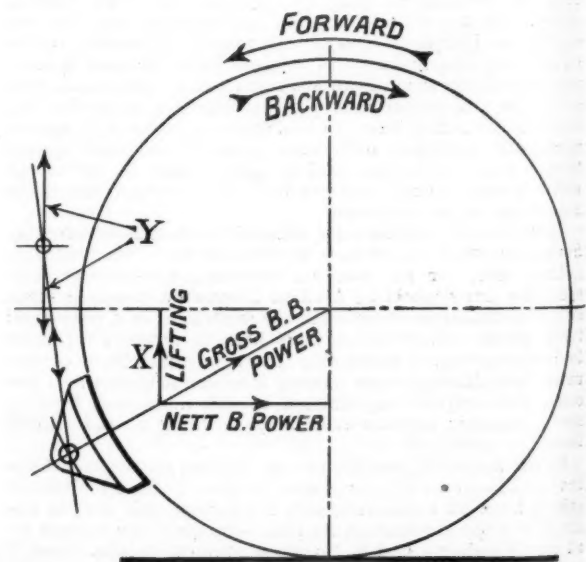
"K" TAKEN AS 15 FOR SPRINGS NOS 1 TO 4 INCLUSIVE AND AS 11.3 FOR REMAINDER

Data of laminated springs for a variety of railway vehicles

When situated above the box the plate surfaces become encrusted with rust and the spring loses much of its original elasticity thereby. In order to ensure the proper functioning of this type of spring, a method of periodic lubrication is necessary—and, incidentally, available—and unless this practice is adopted and maintained, springs will tend to become virtually solid and trouble will arise with broken frame members and the transmission of shocks which otherwise would be damped out. So far as the helical or volute spring is concerned, this is not affected by rust in the same manner as the laminated spring, but if this condition is allowed to persist, the strength of the coil will be diminished by reason of its loss of effective section, and breakage will follow.

A good scheme of suspension is that which combines both types of spring, laminated and coil, and an instance of such is furnished by the Baltic type tank engines built in 1921 by Kitsons for the Furness Railway. These locomotives had helical bearing springs for the leading and trailing bogies and the centre coupled axle, with laminated springs for the leading and trailing coupled axles, thus alternating the types, and in addition to their valuable power and speed characteristics, these engines were remarkably easy units on which to ride. Where an engine is mounted solely on laminated springs the riding tends to be harsh and something approaching that with no springs at all. On the other hand, on a few occasions all springs fitted have been of the coil type—in some instances, of small diameter with solid rubber cores—and here the opposite extreme prevails; the engine is too lively and sensitive to shock, the driving platform being in a continual tremor.

Where care is exercised in selecting the most suitable scheme of suspension, equal care should be taken in other directions. Cylinder inclination, for example; this should be omitted entirely wherever possible, or otherwise kept to the smallest dimensions, since the lifting effect of the crosshead reaction can become very disturbing on the live load. The result is a recurring lifting of the engine front end, and, with outside cylinders, due to the comparatively wide centres of these, the lifting, first on one side and then on the other, produces a tendency to roll that can become serious when running at speed.



LOAD AT RAIL DURING BRAKING OPERATIONS = STATIC LOAD + THE VERTICAL COMPONENT (Y) OF THE LOAD THROUGH THE BRAKE HANGER, BUT MINUS THE VERTICAL COMPONENT (X) OF THE PRESSURE APPLIED THROUGH THE BRAKE BLOCK

Fig. 1—Diagram showing tendency to lift when brake blocks are below axle level

Braking Considerations

Another point of design that calls for the exercise of much discrimination is the height at which the brake blocks are applied relative to the axle centre. Assuming, as in normal locomotive practice, single blocks to be fitted, and their application to be at a level nearly coincident with the axle centre, the whole of the braking effort will be effective. But not a few engines are in service where the brake blocks have a very low position on the wheels, being actually carried on the

of figures shows the disturbance which would have occurred on these due solely to the full brake application on the coupled wheels. To avoid this condition arising, brakes were provided on all wheels and a somewhat lower percentage adopted for the maximum brake power.

Spring Deflection

In 1927 Mr. C. B. Collett introduced the "King" class locomotives on the Great Western Railway, and a feature which evoked much comment was the disposition of the springs on

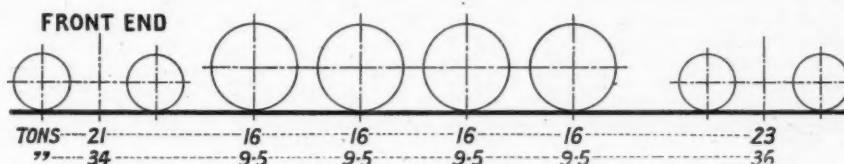


Fig. 2—Example showing (upper figures) normal rail load of a 4-8-4 locomotive with coupled-wheel brakes below axle level and (lower figures) the loads under full braking application on the coupled wheels

crossbeam end trunnions; here the brake force is only partly effective, much of it being expended in forcing the wheels upwards in the guides (see Fig. 1). With a double-ended locomotive—4-4-4, 4-6-4, 4-8-4, etc.—the final result on a full application of the brake is a reduction of adhesive load and an increase in the weights sustained by the bogie springs. If the bogies are unbraked the risk of overrunning at the terminus

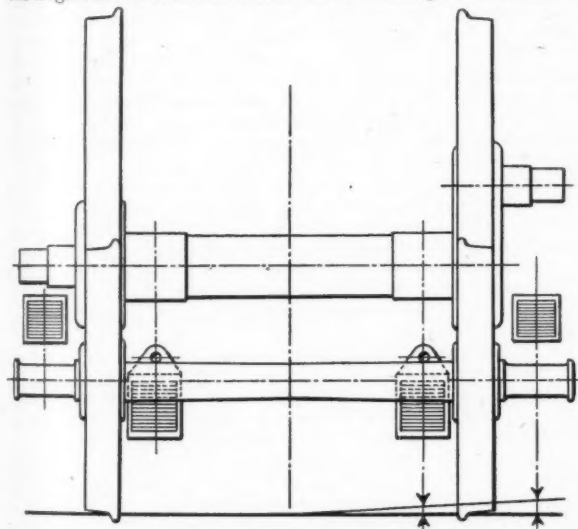


Fig. 3—Relative position of springs for deflection when engine rolls

becomes considerable, and a case is known where a 4-4-4 type engine gave continual trouble until brakes were fitted to the bogies. Illustrative of the foregoing statement is the list of rail weights given by Fig. 2, which shows the wheel system of one of a series of heavy 4-8-4 tank engines built some years ago by a British builder. The upper row of figures shows the rail weights under normal running conditions; the lower set

the front bogie. To avoid complications with the inside cylinders the leading bogie axle was fitted with outside springs and axleboxes, while inside springs and bearings were compulsory for the second axle owing to the proximity of the outside cylinders and mechanism. Such an arrangement was entirely novel in the locomotive world, and as the bogie is fitted with side bearers the question of spring deflection becomes an interesting one. Are the spring deflections proportionate to the relative positions of the springs to the engine longitudinal centre line?*

The writer suggests that where a vehicle has springs in more than one plane transversely, as usually happens with the Atlantic and Pacific types and similar engines, all springs should be calculated for load and deflection as if for application in one plane, which, for convenience, may be assumed as that in which the coupled springs operate. Where springs are situated outside this line, as generally occurs on trailing trucks—or even within it—the spring design should be modified to correct the deflection value per ton, an outward movement naturally calling for an increased amount, and vice versa. Fig. 3 illustrates the principle, and when consideration is given to the modern idea of a high centre of gravity for the machine to ensure effective spring action, the theory advanced appears perfectly logical, although it might be necessary in extreme cases to accept a compromise.

Electric Locomotives

For locomotives with nose-suspended electric-motor transmission, considerable fluctuation occurs in the rail loadings due to the reactions between motors and frame structure, and care must be taken to guard against slipping under the lower adhesion values. With this type of drive the altered loadings are unavoidable, and for high-speed work such conditions are not satisfactory, the preference being rather for the quill or similar drive which has little, if any, influence on adhesion values. For lower speeds the motor-driven jackshaft with rod drive to the road wheels takes preference to the nose-suspended motor, although with the jackshaft drive the spring loadings are subject to some variations, though these

* All the laminated springs on the G.W.R. "King" class engine bogies have the same deflection.—Ed. R.G.

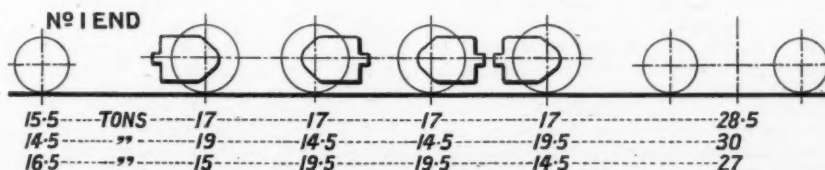


Fig. 4—Example of fluctuation of rail loads in an electric locomotive with nose-suspended motors. Top figures are static loads; middle row are loads when driving with No. 1 end leading; bottom figures are loads with No. 1 end trailing

are not so extensive as with the nose-suspended motor. An example of the variation found in a main-line locomotive operated by separate motors for the several driving axles is given by Fig. 4, the three lines, reading downwards, giving normal static loads, loads when running with No. 1 end leading, and *vice versa*.

Spring Compensation

Many foreign locomotives are fitted with compensating beams, and where the track is not of a high order these additions are valuable in easing the shock to the structure and permitting higher speeds than otherwise would be safe. There are in use several different systems, having 3, 4, 5, 6 or 9 points, and where some engines may be equalised throughout, others have a break in the continuity. Further-

more, while some schemes use the ordinary pin joint, others prefer the cotter, or knife edge, principle; each has good points to recommend it, the first scoring heavily when a derailment occurs, the second having the big merit of increased sensitiveness to the passing of shocks throughout the system. A point that does need stressing is the necessity of keeping all bearing surfaces, whether pin or cotter, clean and free from rust, and, as far as possible, well greased.

The table on page 264 gives laminated springs as designed for a variety of vehicles, with leading dimensions and the stresses, etc., as found by the formulae given earlier in these notes. In every case these units functioned perfectly, and where plates are made of a good alloy steel—chrome vanadium, for example—and the springs receive reasonably good servicing, an extremely long life can be relied on.

THE BOUTET RAIL-WELDING PROCESS

An improved French method of joining rails by welding which has been successfully applied on the Southern Railway

THE Boutet method of thermit welding appears to have overcome the objection to the older thermit welding, that the high temperatures involved tend to produce brittleness in the finished weld. It provides a reliable weld at a relatively small cost, either *in situ*, by means of portable apparatus, or at a rail depot. On the Southern Railway, with a gang of twelve men (one welder in charge; two men making moulds; two men adjusting joints and fixing moulds; two men assisting the welder; one man grinding; two men post-heating; and two men filing), it is found possible to make ten to twelve welds a day, though an increase in the gang would more than proportionately increase the weld output by making it possible to complete a larger number of welds simultaneously. The space available for laying out the rails during welding, and the facilities for handling and running out the long welded rails must, of course, govern the decision as to whether the welding shall be done at a depot or on the site. If the latter, possession of the track must be obtained, and materials and equipment trolleyed to the site from a service van stabled in the nearest available siding, and this reduces the number of welds that can be made by a single gang, as compared with the number possible at a depot.

The welding operation is in three stages—pre-heating, welding, and post-heating. If the welding is being done in the track, after the removal of the fishplates and of the keys, the rails are adjusted to provide a gap of $\frac{1}{4}$ to $\frac{3}{8}$ in.; the end chairs are then packed in order to provide a slight camber over the joint (which is taken out by the heat of the welding), and the rails are then re-keyed. If the welding is being done at a depot, the rails are laid out on a stage formed of rails laid transversely at 2-ft. spacings on timbers; the gap between the rails is as before, and the rail-ends are temporarily supported in chairs. The welding mould is in halves, which are clamped centrally on the two rails at the joint; it is a metal mould, different moulds being used to suit different rail sections, and a special grade of moulding sand is required. The sand is carefully packed into the small spaces at the ends of the mould. Pre-heating is by means of a vapourised petrol flame, pumped through a pipe to the joint by a portable compressor unit. The jet passes into the mould through a horizontal hole in the lower part, and escapes through a rectangular hole at the top; during a space of 12 to 15 min. the foot of the rail is heated to a bright cherry red, and the head to a dull red, the joint being then ready for welding.

Meanwhile a welding charge has been prepared in a swinging crucible, which is supported on a pillar clamped to one of the rails, adjacent to the mould, in such a way that it can be swung into a pouring position immediately above the mould. The iron crucible, in shape an inverted cone, is lined with magnesia, and the pouring hole is plugged with a magnesia plug and steel pin. The appropriate quantity of

welding material, chiefly iron oxide and aluminium, but with certain alloying constituents, is made up in a linen bag, the contents of which are emptied into the crucible. Directly the pre-heating is finished, the contents of the crucible are ignited, and the reaction, which generates great heat (about 2,800° C.) liberates molten steel and aluminium oxide. As soon as the reaction subsides, the steel pin in the plug hole is knocked out, and the steel flows through into the pouring hole at the side of the mould, followed by the molten oxide slag. The latter collects in the dished upper portion of the mould, the surplus being run off into a tray. About 5 min. is sufficient for setting, and the solidified slag can then be removed and the mould stripped. The joint, which has filled in, is now seen to be encased by a bulb of cast steel, which is homogenous with the steel of the rails, and a runner of surplus steel, still red hot, is left projecting above the rail-head. The runner is trimmed off roughly with a set, together with any remnants of slag adhering to the bulb, and when the joint is cool enough, the rail head is ground to the correct contour by means of a portable power-driven grinder.

Post-heating or normalising is now necessary, in order to restore the steel in and adjacent to the weld to a normal structure. For this purpose the weld is encased in a sheet iron muffle lined with refractory clay, and heated up as before with a vapourised petrol flame for roughly 25 min., to just above the critical temperature; the temperature aimed at is about 800° C., and is easily verified with a magnet, as above the critical temperature the steel loses its magnetism. By alternately stopping and resuming the heating, this temperature is maintained for about 15 min., and the weld is then allowed to cool out in air. Finally, the running surface of the weld is finished off with a file to ensure that it is truly level. A portable re-sorbicising apparatus is available for restoring the structure of sorbitic rails after post-heating, but the results obtained in this country have not been entirely satisfactory, and the welding of sorbitic rails has been discontinued.

We are indebted to Mr. G. Ellison, Chief Engineer of the Southern Railway, for these particulars.

CHINESE POSTWAR PRODUCTION PROGRAMME.—A ten-year postwar Chinese reconstruction programme has been outlined by the Chinese Minister of Economic Affairs, according to Reuters. His expenditure programme of \$4,000,000,000 a year aims at the production in ten years of 14,000,000 tons of steel, with a yearly production capacity rising at the tenth year to 5,000,000 tons; 500,000,000 tons of coal; 12,000,000 ounces of gold; machinery costing \$10,000,000,000; 5,000,000 tons of steel plate; 9,500,000 bales of cotton yarn; 3,360,000,000 tons of rails; 2,400 locomotives; and 3,000,000 tons of shipping.

BALANCING LOCOMOTIVE RECIPROCATING PARTS

The influence of cylinder positions on hammer blow effects

WHEN the two papers* on the balancing of the reciprocating parts of steam locomotives were read at the joint meeting of the institutions of Civil and Mechanical Engineers on December 16, one by Sir H. Colam and Major Watson, and the other by Mr. E. S. Cox, Mr. E. C. Poultney said that he considered one of the principal reasons why the balancing of the reciprocating parts in locomotives had assumed importance from the point of view of hammer-blow effects was the change that had taken place during recent years in the use of "outside" as opposed to "inside" cylinder engines. It was pointed out that this was true both of British and Indian practice, and that this change had increased the amount of balance required for given reciprocating masses

circles. A horizontal line is drawn cutting those representing the centres of the balance weights in the wheels, and then through the point of intersection of these two lines is drawn a diagonal at 45 degrees as shown. The cylinder centres are then projected downwards, cutting the diagonal at D, B, C, and E. Then by joining these points with the crank-axle centre, the lines A D, A B, A C, and A E are obtained and A B, A C represent the magnitude of the balance required for each cylinder for the inside cylinder engine, and the lines A D and A E for an engine having outside cylinders. Using the scale chosen to represent the weight of the reciprocating parts proportional to the distance between the balance weights, the weight required to balance these is given by the lengths of the lines joining the crank-axle centre and the diagonal as shown. Further, the angles that these lines make with their respective crank pins are the correct angular positions for the centres of the balancing crescents in the wheel centres. This figure shows clearly that the weight required is always less than the weight to be balanced when the cylinders are between the frames and considerably greater when they are outside, and that the angular position of the balance weights relative to the crank pins is in no way related to the weights to be balanced. It will also be seen easily that in the interest of balancing as to hammer-blow effects, the "inside" cylinder engine is to be preferred, and that for any engine, cylinder centres and also

**MAGNITUDE OF BALANCE WEIGHTS REQUIRED TO BALANCE
EQUAL RECIPROCATING MASSES
INSIDE CYLINDER AND OUTSIDE CYLINDER ENGINES COMPARED.**

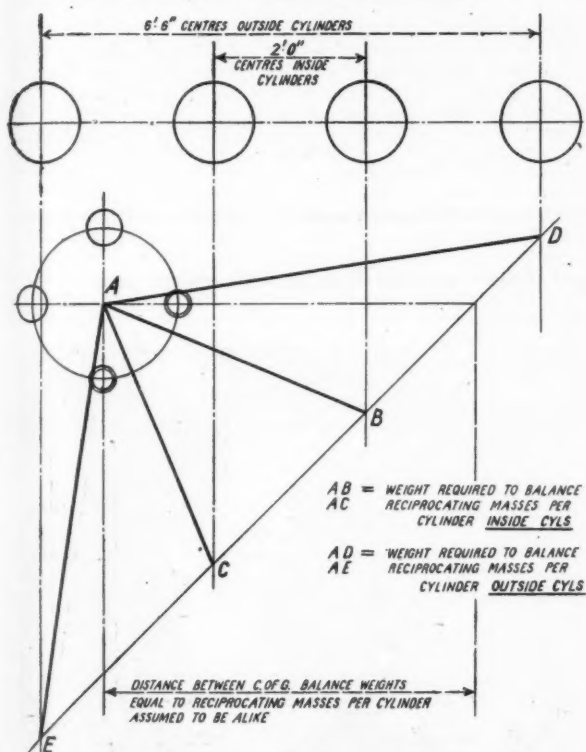


Fig. 1

and balancing conditions by 50 per cent. To illustrate the point, Mr. Poultney exhibited the two figures reproduced and has furnished the following descriptive note:—

Fig. 1 shows in graphic form a method of determining the counterbalance required for both inside and outside cylinder locomotives. For the inside cylinder engine they are shown spaced at 2 ft. centres, and for an engine with outside cylinders the spacing is 6 ft. 6 in. The transverse distance between the balance weight centres is assumed to be 4.9 ft., about 4 ft. 10½ in. and also represents to any convenient scale the weight in pounds of the reciprocating parts per cylinder which it is intended to balance. At A the crank-axle is shown; the main pins are given by the large circles and the coupling-rod pins of the inside cylinder engine by the smaller

**RELATIVE HAMMER BLOWS FOR EQUAL RECIPROCATING MASSES,
INSIDE AND OUTSIDE CYLINDER ENGINES COMPARED.**

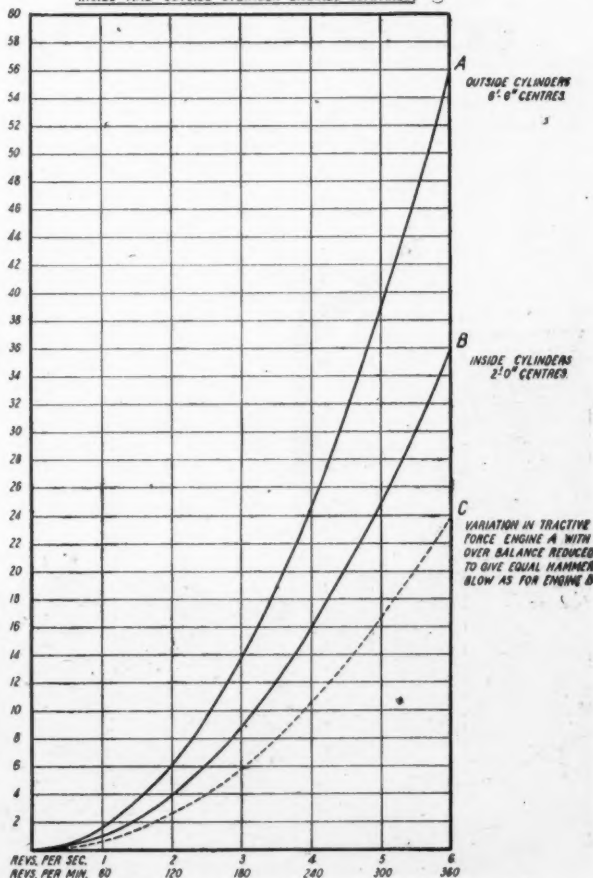


Fig. 2

* Summaries of these papers were published in THE RAILWAY GAZETTE of December 19 & 26, 1941

the transverse centres of gravity of the balance weights should be as close together as possible.

A comparison of the hammer blows given by the two engines is shown by Fig. 2. In this the following assumptions are made: The cylinders are spaced as in Fig. 1 and also the distance between the balance weight centres. The stroke of the piston in each case is 26 in. The hammer blow per wheel per pound weight of the reciprocating masses balanced for the two engines is proportional to:—

$$\sqrt{\frac{A^2 + B^2}{C}}$$

A = distance in feet between the nearest cylinder centre and the balance weight centre taken as the reference plane.

B = distance in feet between the farthest cylinder centre and the reference plane.

C = distance between balance weight centres.

For the outside cylinder engine:—

$$\sqrt{\frac{A^2 + B^2}{C}} = \sqrt{\frac{0.8^2 + 5.7^2}{4.9}} = \frac{5.77}{4.9} = 1.18.$$

For the "inside" cylinder engine:—

$$\sqrt{\frac{1.45^2 + 3.45^2}{4.9}} = \frac{3.74}{4.9} = 0.76.$$

This means that if the distance between the balance-weight centres in the wheels is equal to the weight of the reciprocating masses per cylinder, which for comparison may be represented by unity, then in Fig. 1 the length of the lines AB and AC are equal to 0.76, and AD and AE are equal to 1.18.

The inside cylinder engine requires a balance weight in each

wheel proportional to 0.76 of the reciprocating weights per cylinder for complete balance and for the outside cylinder engine the weights must each be 1.18 of the parts or 18 per cent. more. The curves A and B are calculated from the usual formula which for the inside cylinder engine is:—

$$0.76 \times 1.22 \times 1.08 \times n^2$$

and for the outside cylinder engine:—

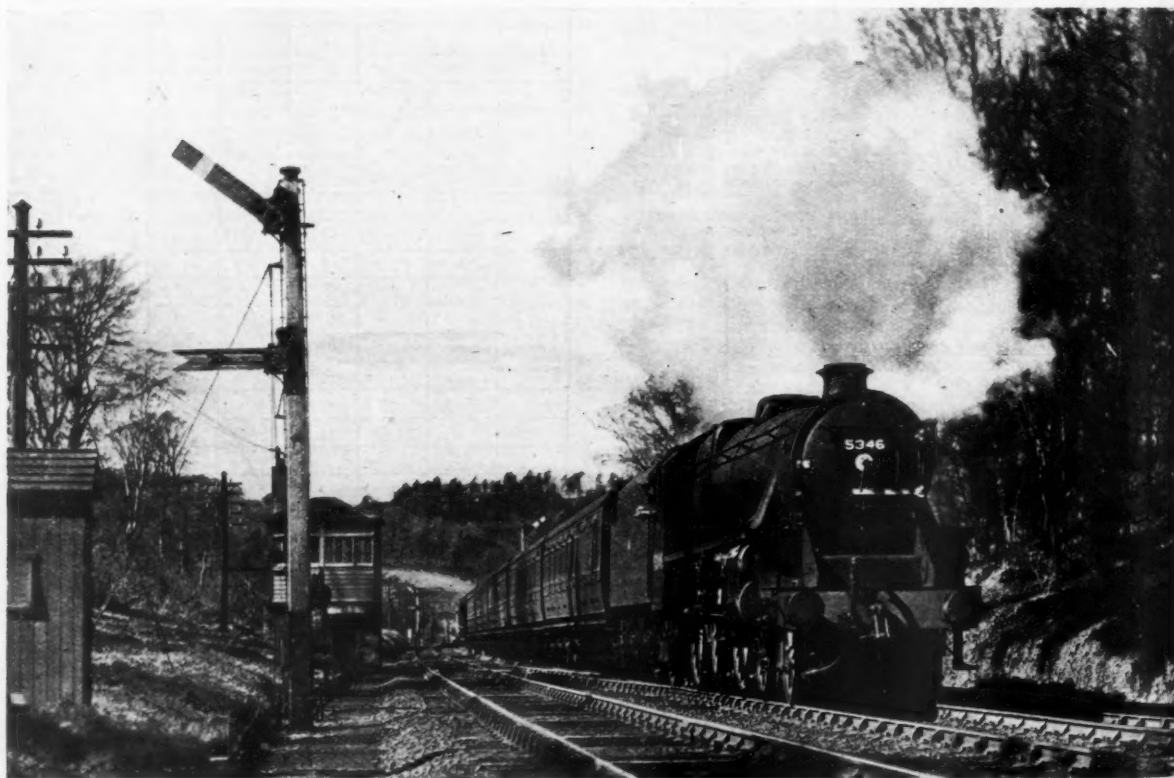
$$1.18 \times 1.22 \times 1.08 \times n^2$$

where 0.76 and 1.18 represent M the mass of the reciprocating parts. The scale readings therefore are proportional to the respective hammer blows per pound weight of the parts balanced, i.e., per pound of overbalance. For a 26-in. stroke and 2-ft. cylinder centres it is interesting to observe that the overbalance multiplied by the revolutions per second squared is the wheel hammer blow. If the outside cylinder engines must give equal hammer blows as for that having cylinders between the frames the balance must be reduced to an equal value, in this case 0.76. It must therefore have an underbalance of $1.18 - 0.76 = 0.42$ or 35 per cent. The variation in tractive effort is therefore:—

$$\sqrt{2} \times 1.22 \times 0.35 \times 1.08 \times n^2$$

This will be the variation in pull per pound of underbalance and the curve C gives values for this plotted against n the revolutions per second in the same manner as the curves A and B showed the hammer blow values. For strokes of 28 and 30 in. the scale reading values must be multiplied by 1.07 and 1.15 and for a 24-in. stroke by 0.9, thus indicating the advantage of a short piston stroke.

L.M.S.R. Class 5 Locomotive with Passenger Train on the Bangor-Liverpool run



Bangor-Liverpool train near Bethesda Junction, L.M.S.R. Stanier mixed traffic 2-cylinder 4-6-0 locomotive No. 5346

[Photo]

[Rev. E. Treacy]

ROAD TRANSPORT SECTION

Roads and Transport in Germany

UNDER the Nazi rule in Germany, one outstanding name has appeared repeatedly in connection with the civil engineering achievements associated with the extensive programme of road construction and improvement, and, since the outbreak of war, that same name has appeared time and again as the organiser of the construction of extensive defence works, and the provision of supply lines to the German forces. Dr. Fritz Todt, to whom, of course, we refer, may be regarded as the most outstanding civil engineer produced in Germany within recent years, and, by reason of his transport achievements, one of our most dangerous enemies. There is no doubt that many of the successful surprises which Germany has delivered with her *Blitzkrieg* methods were due to Todt and to his extraordinarily detailed preparations for the war. Fritz Todt was born at Pforzheim in Baden in 1891, and studied engineering in Munich and Karlsruhe, specialising in road construction. He visited England a few months before the outbreak of war in 1914. During the war of 1914-1919, he served in the German artillery. As early as 1922 he joined the Nazi party and became imbued with the belief in Hitler's mission, particularly with the power of totalitarian organisation (in which Dr. Todt excelled) and the political uses to which it could be put. He found in Hitler a man who responded to his own gifts of organisation and his own technical and strategic ideas. Hitler became Chancellor in January, 1933, and in July of the same year Todt was appointed Inspector-General of German Roads. Under his direct supervision the network of *Reichsautobahnen* spread throughout the German Reich, and up to the borders of neighbouring countries—a network conceived with considerable ingenuity, and executed with great technical ability. In September, 1934, he used the *Graf Zeppelin* to make a widespread aerial inspection of the work. From time to time in our columns we have described the progress of these roads and a map published at page 639 of our issue of November 17, 1939, showed the approximate state at the outbreak of war. The plan for the *Reichsautobahnen* was adopted originally as part of the means of providing employment, but as further schemes were announced, and a clearer picture was obtained of the ultimate extent of the growing network, it became obvious that these magnificently engineered roads had great potentialities for war. Todt visited England again in November, 1937, to inspect British roads and to confer with our own road authorities. On that occasion he belied his name (*Todt* in German means death) by a last-minute change of plans when otherwise he would have occupied a seat in the Belgian plane which crashed with the Grand Duke Georg of Hesse and his family. Work upon the *Reichsautobahnen* proceeded at an increasing pace, and by 1938 the roads were completed in many parts of Germany. In that year Dr. Todt was awarded a National Prize for Art & Science and also was elected President of the Verein Deutscher Ingenieure at the Stuttgart annual meeting.

Shortly afterwards Todt was appointed by Göring to take full charge of all construction work carried out under the four-year plan, and the provision of new waterways and the widening of the Kiel Canal were among the duties assigned to him. He designed and constructed the German West Wall or Siegfried Line in 1938-39. Upon the outbreak of war his organising abilities were recognised by his appointment to the German Cabinet. In common with Dr. Dörpmüller and other civilian transport experts he was given the rank of Major-General. He created the Todt Organisation, a semi-civilian army believed to be nearly half a million in strength, which laid out roads, built fortifications and barracks, repaired bridges and embankments, and supplied armies on all fronts. It built the East Wall (along the German-Russian line of

demarcation in Poland), the "Atlantic fortifications," and military roads in Eastern Europe and the Balkans. The personnel of the Todt Organisation was originally recruited from the German Labour Service, but after the war began it absorbed prisoners of war and civilians recruited "voluntarily" from occupied territories, and by August last Germans comprised only about one-fifth of the total. In 1940 Todt was appointed also Minister of Armaments & Munitions. His death, "in an air crash while on military duty," was announced by the Official German News Agency on February 8, and it was subsequently learned that three of his senior skilled advisers died with him. At the time of his death he was engaged in organising two centres, at Riga and Lwow (Lemberg), in connection with transport and organisation behind the Russian front. Hitler has appointed Professor Albert Speer as Minister of Armaments & Munitions, Inspector-General of German Roads, and Inspector-General for Water & Power, in place of Dr. Todt. Since 1933 Speer has been Building Sites Director in Berlin, and was appointed Inspector-General of Works & Buildings in January, 1938—an office he is to continue to hold. He has thus become virtually Chief Engineer of the Reich, but there is no evidence that he possesses either Todt's technical skill or his organising genius.

Producer-Gas Operation of Buses

THE group of motorbus companies associated with Thomas Tilling Limited has taken a particularly active part in the use of producer gas, and has accumulated an unexampled volume of experience. Although war conditions have provided an added incentive to the efforts to bring the use of producer gas within the range of practical commercial operations, the policy of the Tilling group has been to view such operations not merely as a wartime expedient, but as a permanent feature. In his preface to Mr. Brian Reed's book "Producer Gas for Road Transport," Mr. John F. Heaton, the Chairman & Managing Director of Thomas Tilling Limited, said "a good deal of progress has been made, and, given encouragement by the Government departments concerned, and by the coal industry in the question of price, it is anticipated that the operation by producer gas of road transport vehicles will prove practicable, not only as a substitute when liquid fuel is scarce, but as a permanent feature when normal times return." Naturally the question of fuel is one of major importance to the Tilling group, and at the annual general meeting of Thomas Tilling Limited, held in London on February 17, the statement presented by Mr. Heaton said that the Tilling group had now for many months been working one of its smaller depots exclusively by producer-gas vehicles, and a second depot had recently been converted for the same purpose. By this means it had proved possible to ascertain the exact total cost of operation, and thus make a true comparison with petrol and diesel oil. He continued: "In the vehicles we have converted there has been some loss of power, but nevertheless we have found no difficulty in maintaining our ordinary timetables. In this connection it may be found desirable when times are again normal to design a special engine and chassis for producer gas, and indeed the subject is already having preliminary consideration. One of the major difficulties at the outset of our experiments was that of filtration, and thanks are due to the Chief Engineer of our Eastern National Omnibus Company for having evolved a suitable filter which breaks away from the conventional type in that water is used as the filtering medium. Its adoption, with the addition of arrangements for upper cylinder lubrication, has reduced the cylinder wear for gas-producer vehicles to a figure comparable

A Modern Bus Stop

Right: The latest design of permanent London bus stop. It was designed by Mr. F. R. S. Yorke, F.R.I.B.A., for the London Passenger Transport Board. His problem was to produce a bus sign that would need no painting and would have no rusting parts. It is made of pre-cast concrete with a smooth finish, and is described by our contemporary "Art & Industry" (to the courtesy of whose Editor we are indebted for our illustration) as a lovely piece of street furniture



with petrol-engined vehicles. Up to the present time we have through our group of companies operated by producer gas something over 1,000,000 miles, and as essential services only are operated this means that we have saved approximately 100,000 gallons of imported liquid fuel—a helpful contribution in wartime. There has been a gradual improvement in results; the fuel cost, with anthracite at 85s. a ton, now works out at a figure lower than for diesel oil and considerably lower than for petrol. When, however, we take into account certain additional expenses incurred in operating these vehicles, such as refuelling and attention to the fuel hopper and filter, the total cost of running is then rather higher than by diesel oil, but still lower than by petrol. We are, of course, hopeful of further improvements."

The Roads of Brazil

FROM 1930 to 1940 some 116,000 km. (72,000 miles) of roads were built in Brazil bringing the total length of roads in use to 229,000 km. (142,300 miles). This represents an average daily construction of 32 km. (20 miles) during the decade mentioned, and the length of new roads built in this period is equal to twelve times the length of the Brazilian coast line. The States of São Paulo and Minas Geraes have been foremost in road development and possess, respectively, 50,000 km. (31,000 miles) and 40,000 km. (24,800 miles), or nearly 40 per cent. of the country's highways between them.

GREAT NORTH-SOUTH ROAD PROJECT

The most important project in hand at the present time is a road to connect the extreme north with the extreme south, a distance of 7,500 km. (4,660 miles). A great part of this work is being done by the Federal Government, though the various State Governments are doing their part. The road connecting São Paulo to Rio de Janeiro has already been extended to Muriaé in the State of Minas Geraes and will be extended thence to Teófilo Otoni on the banks of the Rio Doce, and afterwards to Feira de Sant' Ana in the State of Bahia, where it will cross the Trans-North-Eastern road, and proceed to Fortaleza, capital of the State of Ceará. This will provide through communication all the way from Porto Alegre in the south for a distance of approximately 5,000 km. (3,100 miles). From Fortaleza the road is being extended to Therezina, capital of the State of Piauí; 350 km. of the total of 539 km. (335 miles) distance between these points is already complete. The Maranhão State plan provides for roads to connect São Luiz, Therezina, and Belem, thus completing the through road from Porto Alegre to Belem across 13 of the most prosperous States of Brazil.

SAN PAULO-SANTOS ROAD

A new road, with a length of 51 km. (32 miles), is in course of construction in the State of São Paulo between the capital and Santos. It has two asphalted tracks 6.70 m. (22 ft.) wide and a centre strip 3 m. (9 ft. 10 in.) wide, ornamented with low-growing plants so as not to obstruct visibility. The Anhanguera road, 53 km. (33 miles) long, which is of similar design, is also under construction. Excluding expenditure on these two roads, the State of São Paulo spent 30,000 contos on road building in 1940. In the Federal District a deviation of the existing Rio-Petropolis road is nearing completion. It has a width of 60 m. (197 ft.), and is laid out with gardens on both sides.

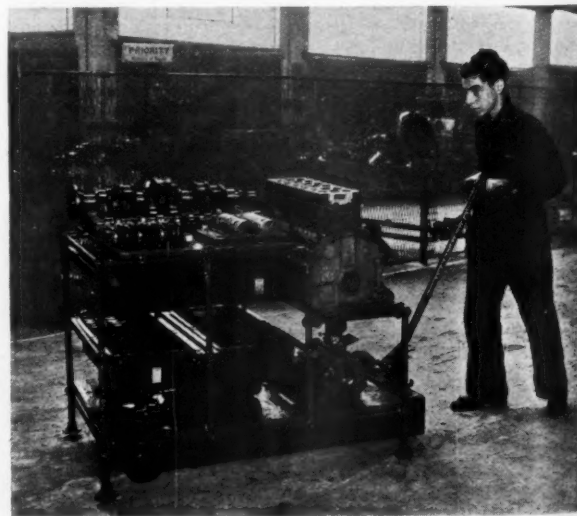
The State of Minas Geraes is building an average of 7 km. (4½ miles) of roadway a day. A road, 600 km. (372 ft.) long, between Bello Horizonte and Uberabá, serving the towns of Pará de Minas, Dolores de Indaiá, and Araxá, of hydropathic importance, was inaugurated in 1940. This will shortly be extended to Goiáz.

In the State of Paraná, the Cerne road, 700 km. (435 miles) long, joining the whole of the northern region of the State to the capital, is now in use and has reduced the journey between the two extremes from 54 to 28 hours; this road cost the State 19,000 contos. The State of Rio Grande do Sul is building roads with an estimated aggregate length of 6,000 km. (say 3,700 miles) at a cost of 80,000 contos; at present 12,000 km. (say 7,500 miles) of roads are in use.

No less active is the State of Rio de Janeiro, where the Niterói-Campos road, 290 km. (180 miles) long, will be a strong competitor of the Leopoldina Railway when completed. Other roads in this State include one from Barra Mansa to the Rio-São Paulo road; another from Magé to Manilha encircling the Guanabara Bay; and yet others from Angra dos Reis to the Rio-São Paulo road, and Maricá to Araruama. A road 672 km. (417 miles) long will join up the Federal District with Victoria in the State of Espírito Santo.

Useful Stand for Engine Components

DURING a recent visit to the London Service Station of Karrier Motors Limited, we were much impressed by the simple efficiency of a specially-designed stand, executed in light tubular construction, to accommodate engine parts in course of overhaul; this we illustrate below. It will be noticed that it may be lifted readily by a trolley (made by the Yale & Towne Manufacturing Company) and transferred to another part of the works. Incidentally, this is but one of many ingenious devices we noticed, that have been adopted to expedite work which carries various kinds of Government priority; a Ministry of Supply priority notice will be seen in our picture.



Neat stand for engine components during overhaul

New Bascule Bridge in Dublin

A description of the recently-erected drawbridge at Sheriff Street, the lifting span of which is balanced by an overhead balance arm and operated electrically

TO replace an inadequate manually-worked bridge, a new lifting bridge was recently erected over the Royal Canal at Spencer Dock, Sheriff Street, Dublin. The total cost is placed at £18,000, of which sum the City of Dublin will subscribe the major share, the Great Southern Railways and Port & Docks Board also contributing. The part played by G.S.R. staff in the placing of the contract and the supervision of the work was outlined at page 436 of THE RAILWAY GAZETTE for October 31 last. The following are details of the new structure, which is believed to be the only large bridge of this type, electrically worked, and carrying main road traffic, in the British Isles.

The lifting span has an overall length of 43 ft. 6 in. and carries a 30-ft. roadway and two sidewalks, each 6 ft. wide. The other principal components of the structure as a whole are two lifting links, two rocker girders with cross bracing, two braced steel towers, and steel foundation frame; a machinery platform girder also spans between the towers.

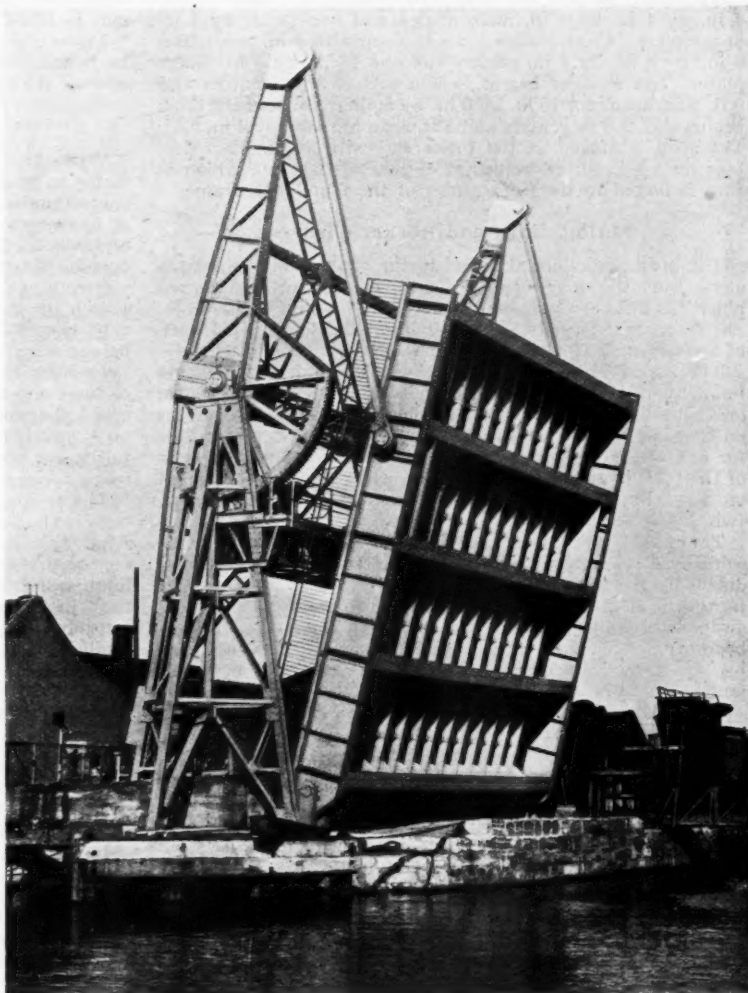
In operation the span is lifted in similar manner to a drawbridge by two lifting links, which are in turn attached to the ends of the rocker girders. The rocker girders are pivoted upon steel braced towers, and at the rear end a large balance box loaded with cast iron and concrete almost balances all the dead load of the bridge. A small allowance against the exact balance is in favour of the span to ensure firm seating under load. The span is raised and lowered by an electric motor situated at the centre of the machinery platform, thus giving a balanced drive to the main quadrants on the rocker girders.

Foundations and Foundation Frame

Several types of foundations were examined in the preliminary stages, and, owing to the poor nature of the ground and the fact that it was considered undesirable to subject the dock wall to either shock or additional load, it was decided that cast-in-situ piles would satisfactorily meet requirements. Accordingly, a 15-in. dia. bored test pile was sunk by the François Cementation Co. Ltd., and as this pile carried a load of 70 tons satisfactorily, the four groups of piles provided were of this type. The heads of each group were bound together by a 3 ft. 6 in. thick reinforced concrete cap. The maximum working load on any one pile is approximately 40 tons.

A steel foundation frame was constructed and firmly bolted to these pile groups, so as to carry the whole of the loads acting upon the span or towers and transfer these to the pile caps. The maximum loads on this frame were heavy and the section had to be very sturdy to eliminate any possibility of deflection. It measures 63 ft. 6 in. in length and 16 ft. 10 in. in width, and the front girder is 5 ft. deep with $\frac{1}{2}$ in. web and two $\frac{3}{4}$ in. stiffening plates at heavy load points, 6 in. by 6 in. by $\frac{1}{2}$ in. main angles, and three 16 in. by $\frac{3}{4}$ in. flange plates. The rear girder is 3 ft. 6 in. deep with $\frac{3}{4}$ in. web plate, 6 in. by 6 in. by $\frac{3}{4}$ in. flange angles, and one 16 in. by $\frac{3}{4}$ in. flange plate. The cross beams are 18 in. by 6 in. by 55 lb. rolled steel joists.

The main towers are built upon the foundation frame and



The Sheriff Street lifting span bridge, Dublin

are of the braced tripod type with the two front legs vertical and the rear leg splayed out. The height of the towers is 37 ft. and the base is 16 ft. wide, parallel to the roadway, and 8 ft. deep back splay. The main front legs are 10 in. by 8 in. by 55 lb. r.s.j., and the rear leg and all other bracing members are 10 in. by 3 $\frac{1}{2}$ in. by 24.46 lb. r.s. channels.

The machinery girder connecting the two towers above the roadway has a minimum headroom for traffic of 17 ft. The span between the tower legs is 47 ft. 6 in., the depth of the girder, which is a lattice box type, 4 ft. and width 5 ft.

The top booms are 10 in. by 3 in. by 19.28 lb. r.s. channels, bottom booms 4 in. by 4 in. by $\frac{3}{8}$ in. angles, and all diagonal and cross bracings are 3 in. by 3 in. by $\frac{3}{8}$ in. angles. The top boom of this girder is plated with $\frac{3}{8}$ in. chequer plate and carries all the driving machinery, access to which is gained by a rung ladder at one end.

The Main Lifting Span

The lifting span, which is designed to carry two trains of 15 units of British Standard Loading for Highway Bridges plus 1 cwt. per sq. ft. of unoccupied vehicle area, comprises

two main girders supporting five cross girders, which in turn carry stringers and cross beams, the whole of the roadway portion is also covered with $\frac{3}{4}$ -in. dished plates. The span is 40 ft. 3 in. from centre of bearing to centre of hinge, and the roadway is metalled with a concrete base and surfaced with asphalt. The sidewalks are of 3-in. oak timbers on 11 in. by 4 in. bearers.

The main girders are 4 ft. deep with $\frac{3}{4}$ in. web plates, 4 in. by 4 in. by $\frac{1}{2}$ in. main angles and one 14 in. by $\frac{3}{4}$ in. flange plate. Cross girders are 3 ft. deep with $\frac{3}{4}$ in. web plate, 6 in. by 6 in. by $\frac{1}{2}$ in. angles, and one 16 in. by $\frac{1}{2}$ in. flange plate. The stringer beams, which are at 3 ft. centres and 9 ft. 9 in. span, are 16 in. by 6 in. by 50 lb. r.s.j., and the cross beams also at 3 ft. centres and 3 ft. span are 8 in. by 4 in. r.s.j. The span is hinged at the tower end with 10-in. dia. steel pins resting in an all-welded steel pedestal bearing, which in turn is bolted to the front girder of the foundation frame.

Lifting Links and Rocker Girders

The lifting links are attached to the span about two-thirds along from the hinge end by means of 12-in. dia. turned pins. The links are composed of two 9 in. by 3 in. by 17.46 lb. r.s. channels battened together at intervals along their length of 34 ft. 6 in.

The rocker girders are attached at one end to the lifting links by 12 in. dia. steel pins, and are pivoted at the centre on 12 in. dia. pin bearings on the main towers. The bearings on the tops of the towers are of the self-aligning type to allow for any slight settlement which may occur. The rear ends of the rockers are joined together by the balance box. Rigid cross bracings are also built in between the girders to prevent twist.

The main rocker girders are 6 ft. deep and 61 ft. long with 6 in. by 6 in. by $\frac{3}{4}$ in. main angles, 16 in. flange plates, and diagonals of 6 in. by 3 in. by $\frac{1}{2}$ in. angles. The girders taper from 6 ft. at centre to 2 ft. at ends. The main cross bracing girder between the rockers is 6 ft. deep and 44 ft. span with boom angles 5 in. by 3 $\frac{1}{2}$ in. by $\frac{1}{2}$ in. and bracings of 2 $\frac{1}{2}$ in. by 2 $\frac{1}{2}$ in. by $\frac{3}{4}$ in. angles. The diagonal bracings comprise four angles 3 $\frac{1}{2}$ in. by 3 $\frac{1}{2}$ in. by $\frac{3}{4}$ in. with flat lacing bars.

The balance box is 44 ft. 4 in. long by 5 ft. by 5 ft. and is built up of $\frac{3}{4}$ -in. plates and 3 $\frac{1}{2}$ in. by 3 $\frac{1}{2}$ in. by $\frac{3}{4}$ in. corner angles the inside is stiffened with 6-in. and 4-in. flats welded in. The total weight carried by the box is approximately 80 tons.

Mechanical Equipment

The drive is transmitted from the electric motor through a worm reducer and differential gear to a double spur reduction gear at each tower. The final pinion at each side engages with a toothed quadrant attached to the overhead rocker beams. The lifting effort at the two beams is maintained exactly equal by the differential gear, and any shocks due to severe braking or mis-handling are taken by substantial flexible couplings in the intermediate shaft.

The motor, solenoid brake and combined worm reducer, and differential gear are mounted together in a cast iron bed plate forming one unit. These gears are totally enclosed and run in an oil bath; the shafts are carried on ball and roller bearings. The slow-speed shafts are carried in substantial

gunmetal-lined bearings fitted with grease-gun lubrication. The pivot, hinge, and link bearings are all gunmetal lined and lubricated by grease-gun. All gearing has a minimum factor of safety of 5, and ample power is provided to operate the bridge against a wind pressure of 15 lb. per sq. ft. The normal time occupied in opening the span is 1 $\frac{1}{2}$ min.

A square extension is provided on the worm shaft to which a cranked handle may be fitted, by means of which the bridge may be lifted by two men in about 15 min.

Protective gates of the swing type are provided and must be bolted before the bridge can be opened. The drop bolts operate the switches which close the electrical circuit.

Method of Operation

When the bridge has to be opened to allow waterborne traffic to pass, the operator first throws over the small switch controlling traffic lights; this will extinguish the green lights and cause the red lights show. The next operation is to close and bolt the gates after which the bridge can be started in the opening direction by means of the master controller, and it will continue to run until shut down by the fully-open limit switch on the tower. This limit switch opens a contactor type circuit-breaker, and before this can be reclosed it will be necessary to return the controller to the "off" position.

In order to close the bridge the motor is started by means of the controller, and, as soon as it has attained a reasonable speed the controller should be moved right on to the "full on" position. The bridge will then continue to move at full speed until stopped by means of the closed limit switch when a few inches from the fully closed position.

The opening of this limit switch, as when opening the bridge, causes the contactor type circuit-breaker to open circuit. After this has occurred the operator places the controller on the first notch in the lowering direction, and due to the limit switch being open, a circuit will be available through the "inch" button to close and open the circuit-breaker, thus causing the bridge to move downwards in a succession of small steps, it being understood that the motor will only run for so long as this button is held closed.

Interlocking and other Electrical Equipment

The operating circuit of the circuit breaker is completed through one pole of the light operating switch which is only closed when the red light is showing, the switches operated by the bolts securing the gates and the "off" position interlocks on the controller.

It will be realised from this description of the method of operation, that the "off" position interlocks on the controller are rendered inoperative by the opening of the closing limit switch, thus enabling the "inching" to be carried out with the controller on the first lowering notch.

The motor provided is of the totally-enclosed, weather-proof, slipring induction type, of 30 h.p., running at 725 r.p.m.

The bridge generally was designed, constructed, and erected by Head Wrightson & Co. Ltd., Teesdale works, Thornaby-on-Tees, to the drawings and specification supplied by Mr. G. J. Murphy, M.Inst.C.E., Chief Engineer of the Great Southern Railways of Eire, to whom we are indebted for the foregoing details of this unusual bridge.

THOMAS TILLING LIMITED AND LONDON TRANSPORT "C" STOCK.—Mr. J. F. Heaton, Chairman & Managing Director of Thomas Tilling Limited, in the course of the statement circulated with the report and accounts of the company for the year ended December 31, 1941 (which took the place of the Chairman's speech at the annual general meeting held in London on February 17), referred to the position of London Transport "C" stock which he said was still unsatisfactory. His company held £1,207,675 of this stock which stands in the books at the written-down figure of £966,140, but Mr. Heaton pointed out that against this the market price at the end of the year had been £483,070. The total gross interest on the stocks allotted to the com-

pany in consideration for its London bus business amounted, in the year under review, to £60,010. Mr. Heaton said that it might be pertinent again to remind shareholders that the average net profits of the business acquired from the company by the London Passenger Transport Board were in excess of £150,000 a year. Shareholders would remember that Parliament had granted the stockholders, in case of default, the right of application to the court for the appointment of a Receiver & Manager, but this right, of course, had to be held in abeyance during the period of Government control. He mentioned this again as shareholders from time to time addressed to him their inquiries on the subject.

Special Point Locking and Signalling on the Mumbles Railway

Spring returned points are normally locked but unlocked automatically in time for trailing movements; facing point indicating and block signals are approach lighted

THE passenger service on the 5½-mile Swansea & Mumbles Railway, operated by horses from 1807 to 1877, and with steam locomotives thereafter until the introduction of electric traction in March, 1929, was worked for nearly a century and a quarter without any signalling or safety devices of any kind, if we except the local padlocking of a few siding points, introduced in the steam days as a precaution against outside interference, as the line runs largely along the side of the highway. Although the railway was single, no need of signalling appears to have been felt, nor were there any train accidents, as far as can be ascertained, to induce a change of practice in this respect. The fact that the line ran along the side of the road, in some cases close in front of the doors of houses, and was unfenced—except for a certain length rebuilt in later years at the Mumbles end—meant, however, that there must always be a risk of people being run over, seeing that it was necessary to cross the track to pass to or from certain streets, buildings, and properties. The number of mishaps of this kind appears to have been remarkably small, however. Speed was limited to 4 m.p.h. in Swansea itself, and to that of a horse tramcar elsewhere, under an Order made by the Railway Commissioners. Nevertheless, accidents led to considerable discussion taking place between the railway and various local authorities regarding the advisability of fencing the line—at least at certain places—and even to the company promoting a Bill in 1891 for the purpose, which it eventually withdrew in the face of local opposition. The matter came into prominence again after a child had been run over in 1894, when the usual public inquiry was held by a well-known Inspecting Officer of the day, Major-General Hutchinson, who thought that some fencing was desirable in spite of the views expressed against it, but nevertheless the line has remained unfenced to this day, save for the rebuilt portion above alluded to. The numerous gates—necessarily of the unattended type—which any fencing system would involve would have been a great nuisance and expense, and would themselves be liable to misuse.

Introduction of Safety Devices; Point Locks

One of the objects aimed at when electrifying the line was a shorter journey time, but a speed restriction of 5 m.p.h. over facing points, which would have had to be imposed if plain spring returned points were retained at the passing loops, would have prevented the best results being attained. It was therefore considered essential to lock the loop points, but the ordinary f.p. lock worked by a signalman was out of the question. What was required was a lock which could be withdrawn automatically by a trailing movement in time to allow of the point tongues being moved over against the return spring without damage, and would relock the points after the vehicle had passed. In the last few years one or two locks of this description have found favour in the U.S.A. for ordinary main-line service, but in 1928, when the matter was under discussion with the Mumbles Railway, such working is thought to have been new, and certainly for passenger services in this country it was so. The apparatus adopted was designed by the W. R. Sykes Interlocking Signal Co. Ltd. of Clapham, and consisted of a cast-iron case, securely fixed adjacent to the closed point tongue, in which were two strong notched transverse slides, each connected to a tongue and normally held fast by a lock blade, thus forming an f.p.l. on the principle met with in some electric point machines. The lock blade shaft was connected from a crank on the case with a depression bar fixed outside the left hand rail of the outgoing line and reaching far enough forward for a wheel to be holding the points open before passing off it. (The wheel treads of the new cars were wide enough to ensure absolutely reliable operation of an outside bar.) The

engaged position of the lock blade was electrically detected and an independent point detector was provided for the closed point tongue, as an additional precaution. This was of an unusual design and was bolted to the stock rail, through a hole in which there passed a spring-loaded plunger, the nose of which was normally kept slightly depressed by



Facing points with automatic lock, depression bar, and light signal

the tongue. The condition of the points and lock was indicated to an approaching car by a two-aspect colour light signal, the green light signifying that everything was normal, while if the lock blade moved the very smallest amount the red light was switched on. It was originally intended that these signals should be normally lighted and extinguished by the conductor of the last up car at night, but, as explained below, it later proved possible to have normally dark signals.

Automatic Block Signals

No signalling, in the ordinary sense, was at first contemplated when electric traction was adopted, but after the point locking mechanism had been approved it was thought desirable to provide signals to control the single line sections, as has occasionally been done on electric tramways. Main-line token instrument working would not, of course, have been practicable and a track circuit system was regarded as too expensive. It was therefore decided to use apparatus operated by intermittent contact, taking power from the trolley circuit, but normally de-energised. This enabled the f.p.l. signals normally to be de-energised also, since unless a

train was occupying a single line section—or about to do so—such signals were obviously not required to give any indication. The wish to have a very distinctive signal for the block section working was met by providing a case with a round glazed opening, 11 in. diameter, in which normally nothing was visible save some unlighted electric lamps. Bright red and white celluloid discs could be moved into view behind the window by electro-magnets, and the lamps behind the discs simultaneously turned on, together with those in the adjacent facing point signal, which was mounted on the same trolley wire standard near the points but, of course, facing in the opposite direction, that is to say towards the single line. Electric contact makers, touched by the car pantographs, effected the necessary control through a heavy sticking polarised relay with carbon contacts in each signal, and a four-wire cable between passing loops. The signal indications were very simple and easily understood by a motorman. On arriving at a loop and finding the red disc exhibited, he knew an opposing car was on its way and he must wait for it to arrive and release the disc. If the white disc was showing he knew a receding car was still on line and that he must wait for the disc to disappear. If, however, the signal was neutral he drove slowly past the contact maker placed near the loop outlet, which at once caused the red disc to come into view at the opposite end of the section. This action was then repeated back and brought the white disc into view in the signal facing the motorman. The change from normal to white was the authority to proceed—and except in case of a breakdown or other defined emergency—no motorman might enter a section unless he had produced this change in the way described. All circuits were independently fused and fed through vitreous resistance units. The contacts operated by the signal disc magnets, which were relatively slow acting, were of the mercury tube type, to eliminate sparking troubles.

There is always a possibility, though somewhat remote, with signal systems of this kind, that two opposing cars may actuate the setting contact makers at precisely the same instant, which, unless special measures were taken against it, would result in red signals being shown to both, with consequent confusion and stoppage of traffic. To meet this the red discs were fitted with a lock to retain them in position, removed by the normal clearing of the section, and the circuit of their electro-magnets arranged to be interrupted if the white discs were pulled into position behind them. In the signal at the west end of each section an attachment to the white disc was fixed so as to push this lock aside and allow the red disc to drop, electrically releasing the white one behind the red in the signal at the east end of the section.

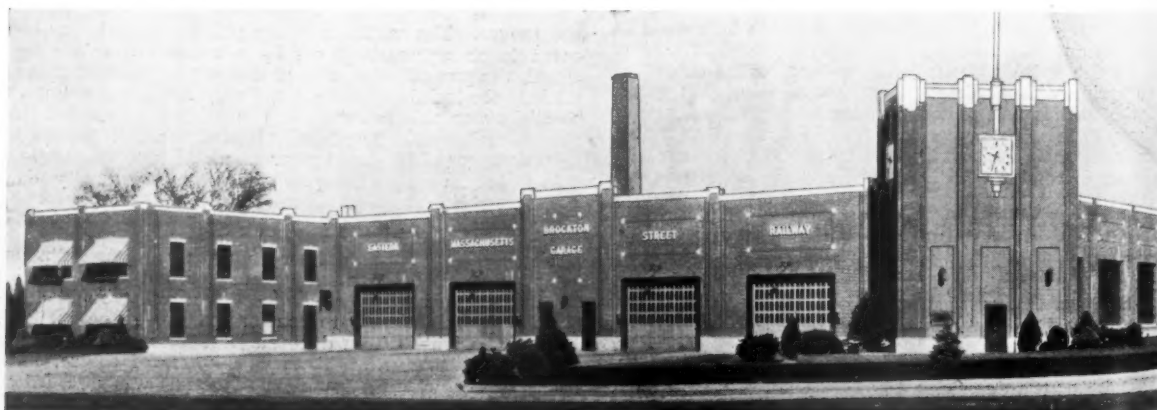
By this means if an eastbound (to Swansea) and westbound car reached the setting contacts at the same instant the former always received permission to proceed and the latter was held by a red signal. Although such a system of signaling cannot give the facilities afforded by track circuit con-



Automatic single-line block signal and depression bar

trol, it affords sufficient protection to enable the class of service concerned to be run safely and punctually. It is essential, however, to have very clear and well-drawn rules covering emergencies and to see that they are strictly enforced.

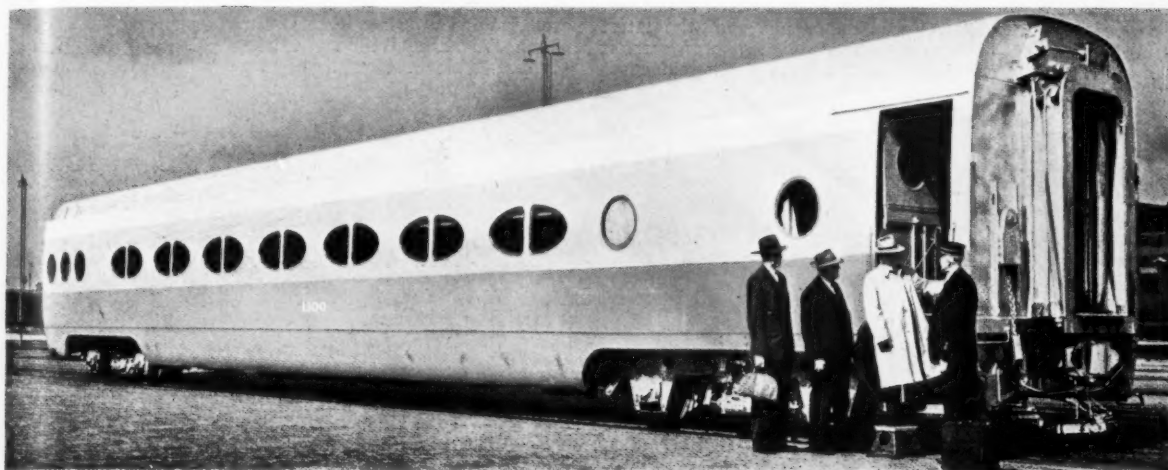
A Modern U.S.A. Bus Garage



An artist's impression of the Brockton garage of the Eastern Massachusetts Street Railway Company. This undertaking formed the subject of a short article on page 130 of our January 23 issue

PENDULUM SUSPENSION FOR RAILWAY VEHICLES

An ingenious method which by placing suspension above the centre of gravity promotes smooth riding

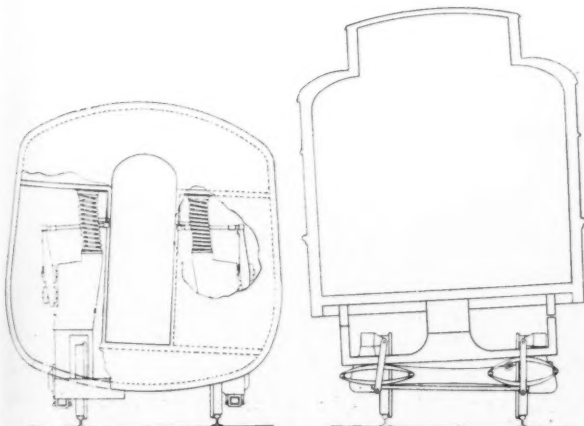


A PENDULUM-TYPE passenger car, designed and built by the Pacific Railway Equipment Company of California, has been delivered recently to the Atchison, Topeka & Santa Fe Railway and, when placed in service will be operated between Los Angeles and California, and scheduled at 39½ hr. The car, which is designed to float suspended 2 ft. above its centre of gravity, is a new departure and uses recent important developments in the aviation and motorcar fields. The design of the new carriage permits it to bank like an aeroplane when negotiating curves and deep springing is said virtually to eliminate rail joint jolting. After the style of a number of lightweight streamlined coaches, the new car is of stressed-skin construction; the outer covering forms an integral part of the frame and the body resembles a reinforced tube. This type of construction is especially strong and is used largely in modern aeroplane construction. In trial tests, which were completed in November, 1941, the car is reported to have shown a high degree of riding comfort, quietness, and freedom of vibration at speeds up to 100 m.p.h.

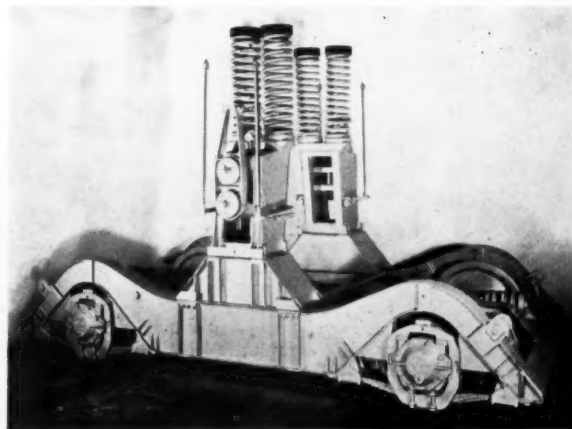
In THE RAILWAY GAZETTE of July 22, 1938, we illustrated one of the bogies and showed by means of a sketch a

method of mounting a coach on it. The new type of bogie pendulum suspension had then been introduced experimentally on the Atchison, Topeka & Santa Fe Railway. A diagram is given to show the effect of the pendulum system in comparison with the orthodox method of suspension when the vehicles are traversing a right-hand curve. It will be observed that, instead of leaning outwards, the body of the pendulum car actually cants inwards, because the point of suspension is above the centre of gravity. A very smooth riding vehicle is thus provided.

The particular vehicle which was the subject of test was articulated with end bogies having a 9 ft. wheelbase and the articulating bogie a wheelbase of 12 ft. The total weight of each of the former, completely equipped, is only 3½ tons, and of the 12 ft. bogie 4½ tons; these light weights have been achieved by completely welded construction and the use of high tensile steel. The springs on which the vehicle is suspended permit, through horizontal deflection, the necessary bogie truck movement relative to the body. A pair of horizontal links elastically restrained by rubber acting between the body of the car and the bogie frame controls this motion.



Sectional diagrams of pendulum and sectional coaches showing action on right-hand curve

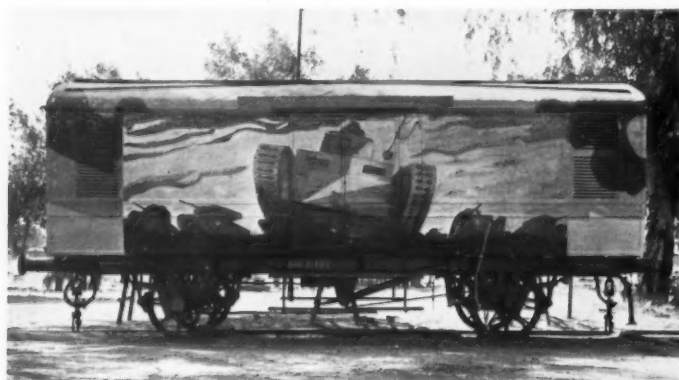


All-welded bogie with coil springs for pendulum suspension of coach

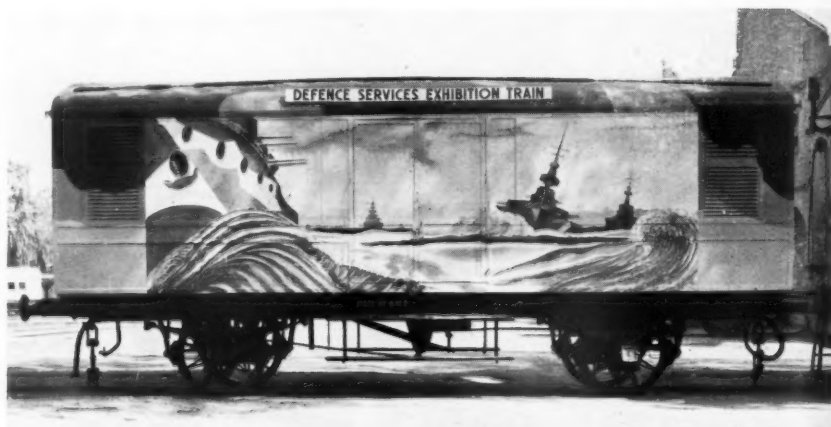
INDIAN DEFENCE SERVICES EXHIBITION TRAIN

AS briefly announced in our issues of October 24 and 31 last, the Indian Defence Services Exhibition train left Lahore on a tour of the sub-continent on October 17. After an inaugural ceremony at which the Governor, Premier, and Ministers of the Punjab were present, the train began its five-months' journey. As well as examples of the latest engines of war such as guns, tanks, and armoured cars, it contains a cinema showing films depicting the heroic deeds

of the Indian Army in Eritrea, Syria, and elsewhere. The train is painted in vivid colours and, in particular, three battle scenes occupying the sides of vehicles are strikingly arresting; they are the subjects of the accompanying illustrations. It is noteworthy that these paintings are the handiwork of the ordinary painting staff of the North Western Railway carriage shops at Moghalpura (Lahore) where the train was fitted out for its long journey.



Above: Some of the handiwork of the N.W.R. painting staff upon the sides of vehicles of the train, depicting (left) tanks in action, and (right) a camouflaged aeroplane; the bogie upon which the latter is painted houses the train battery charging plant



Above: A naval action painted on the side of a four-wheel van

Left: A four-inch gun mounted on an open truck. Ratings of the Royal Indian Navy demonstrating drill with this weapon

Right
round
tip-up

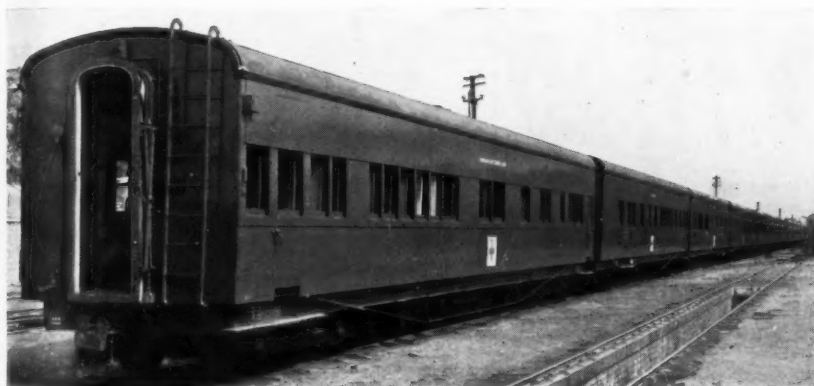
Indian Railways and the War

Indian Defence Services Exhibition Train



Left: General view of the train. Right: Naval demonstration of breeches buoy

Ambulance Train built in Indian Railway Workshops



Left: General view of a metre-gauge train made up of five ward cars, two officers' sick cars, one medical headquarters car, one dispensary car, one stores car, one British kitchen car, one Indian kitchen car, and an auxiliary water tank

Right: Interior of ward car showing cloth screens round (left) an upper bunk and (right) a lower tip-up bed, to secure privacy for the patients. Note ice-box in centre of each ward



Scenes on Narrow-Gauge Yugoslav Railways

(See page 261)



An express on the 2 ft. 6 in. gauge line from Belgrade to Dubrovnik



Characteristic wayside scene on the 2 ft. gauge line between Skoplje and Ohrid



A mixed passenger and goods train taking water on the 2 ft. gauge Skoplje-Ohrid line, most of which has now been taken over by Albania

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GENERAL NEWS SECTION

PERSONAL

L.M.S.R. APPOINTMENTS

The directors of the London Midland & Scottish Railway Company have approved the following staff changes:—

Mr. W. A. Robertson, Assistant to District Engineer, Northampton, to be District Engineer, Lancaster, *vice* Mr. F. G. T. Adams, retired.

Commander W. B. Clementson, Marine Superintendent, Goole, to be Marine Superintendent & Harbour Master, Heysham Harbour, *vice* Captain G. H. Barnish, deceased.

Captain J. J. Barker, Outdoor Assistant to Marine Superintendent, Goole, to be Acting Marine Superintendent, Goole.

Mr. E. Overend, Station Working Assistant, District Goods Manager's Office, Broad Street, to be Goods Agent, Broad Street, *vice* Mr. H. Viner, retiring.

Mr. W. Broadhurst, Goods Agent, Kendal, to be Goods Agent, Barrow, *vice* Mr. H. Tomlinson, promoted.

Mr. F. Sparkes, District Controller, Skipton, to be District Controller, Gloucester, *vice* Mr. L. J. Cook, retiring.

Mr. S. T. Fawkes, Assistant District Controller, Saltley, to be District Controller, Skipton, *vice* Mr. F. Sparkes.

Mr. A. Wood, Assistant Divisional Controller (Freight Services), Office of Superintendent of Operation, Manchester, to be District Controller, Preston, *vice* Mr. H. S. Whittaker, retiring.

Mr. R. A. Buckler, Stationmaster, Southend & Southend East, to be Stationmaster & Goods Agent, Tilbury (Riverside), Tilbury Town & Gravesend, *vice* Mr. W. C. Keep, retiring.

Mr. William Allan Hill, M.Sc., A.M.I.C.E., who, up to the end of last year, has been employed by the London Midland & Scottish Railway as Resident Engineer at Nottingham, has been appointed Chief Civil Engineer of the Belfast & County Down Railway in place of the late Mr. P. A. Amott. Mr. Hill was formerly in the service of the London Midland & Scottish Railway (Northern Counties Committee) in Belfast.

The Red Cross & St. John War Organisation announced on February 10 that Mr. Stanley Adams would shortly resign his position as Managing Director of the Prisoners of War Department. Mr. J. M. Eddy, Chairman of the Buenos Ayres Great Southern, and the Buenos Ayres Western Railways, will take over his duties at the Prisoners of War Department. Mr. Adams will remain at the disposal of the department for advice and consultation. As was recorded in our issue of February 7, 1941, Mr. Stanley Adams, Chairman of Thomas Cook & Sons Ltd., agreed to act without any remuneration in the parcels department of the British Red Cross. Mr. J. M. Eddy, as recorded in our issue of February 21, was appointed by the British Red Cross & St. John War Organisation to

visit Liscon to investigate matters concerning parcels for British prisoners of war.

Mr. P. D. Troskie, Chief Traffic Manager, South African Railways & Harbours, who, as recorded in our December 12 issue, has been appointed Assistant General Manager (Commercial), joined the railways at the beginning of 1912 in the Assistant General Manager's Office at Bloemfontein. He was transferred in 1915 to Windhoek, where he remained for two years, and was then transferred to the General Manager's Office, Johannesburg. In 1925 he was appointed to the Railway Board Office and, at the end of 1929 became private secretary



Mr. P. D. Troskie

Appointed Assistant General Manager, South African Railways & Harbours

to the Minister of Railways & Harbours, and to the Railways & Harbours Board. Two years later he became Superintendent (Commercial Operating & Staff) in Johannesburg. In 1932 he was transferred in a similar capacity to Capetown and remained there until 1935, when he was appointed System Manager at Bloemfontein. In December, 1936, Mr. Troskie was appointed Chief Superintendent (Staff) at headquarters; he retained that position until 1938, when he was appointed System Manager in Johannesburg. In 1941 Mr. Troskie was appointed Chief Traffic Manager. He was a member of the committee of S.A.R. experts who in 1937 attended the International Railway Congress in Paris and, while Chief Superintendent (Staff), he was Chairman of the Railway Conciliation Board, for two years.

Mr. C. Grasemann, Public Relations & Advertising Officer, Southern Railway, who is also Chairman of the Publicity Committee of the Railway Executive Committee, was recently installed as Master of the Honourable Company of Fruiterers for 1942. At a luncheon given to entertain the Lord Mayor, the chief guests were The Rt. Hon. A. V. Alexander, First Lord of the Admiralty, Sir Alan Anderson, Controller of Railways at the Ministry of War Transport and Chairman of the Railway Executive Committee, and Mr. E. J. Missenden, General Manager of the Southern Railway.

We regret to record the death on February 7 of Mr. William A. Foster Graham, Deputy Traffic Manager, Great Northern Railway (Ireland). The funeral took place at Mount Jerome Cemetery, Dublin, on February 10.

Mr. H. Stewart Coe, Secretary of the Great Southern Railways Company (Eire), has retired under the age limit of 65 set up by the company at a meeting on February 6.

Mr. P. J. Floyd, Traffic Manager, Great Southern Railways Company (Eire), has retired under the age limit of 65 set up by the company at a meeting on February 6.

Mr. J. Fearfield, formerly Manager of the Maharaja of Bikaner's Railway, left an estate in Great Britain valued at £9,592.

THE INSTITUTION OF LOCOMOTIVE ENGINEERS

Members

Mr. Bertram Douglas Fox, Partner in Messrs. Freeman, Fox & Partners.

Mr. Herbert John Hammersley, Leading Hand Draughtsman in charge of Diesel Locomotive Traction Department, Vulcan Foundry Limited.

Mr. Robert Tebbutt, Designing Engineer in charge of Design Office, C.M.E. Department, New South Wales Government Railways.

Associate Members

Mr. Juan Pedro Terrile, Assistant Engineer, Railway Department, Messrs. Evans, Thornton & Co., Buenos Aires.

Mr. Lester Constantine Edwards, Senior Draughtsman, Locomotive, Carriage & Wagon Branch, Jamaica Government Railway.

Associate Members to Members

Mr. Geoffrey Wynn Hamel, Mechanical Transport & Workshops Manager, R.A.S.C.

Mr. John Frederic Harrison, Mechanical Engineer, Gorton, L.N.E.R.

Mr. Edward Lawton, Engineer, Superheater Co. Ltd.

Graduates to Associate Members

Mr. Kenneth Arnold Critchley, Draughtsman, C.M.E. & E.E. Department, L.M.S.R.

Mr. Cedric Arthur Pass, Head Office Inspector, Motive Power Department, L.M.S.R.

Mr. John William Hulme, Technical Instructor, Government Training Centre.

British Railways and the War—102



Above: Royal Engineers at a railway training centre where they are studying maintenance and repair of railways



Right: Paddington Station has its own hospital in which 9,200 persons have secured treatment from nurses who are members of the G.W.R. staff



The L.N.E.R. has recently removed the steelwork forming the roof of Market Rasen Station for re-erection when required as the roof of a goods depot, in the event of enemy action damaging the structure and so render a vital goods traffic liable to damage by water. The slates and timber of the roof are also to be used in the same way as required. Our picture shows the removal of the roof spans

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TRANSPORT SERVICES AND THE WAR—128

Limitation to 1 cwt. of packages by passenger train—Charges for Government traffic—Trans-Canada Air Lines in 1941—The "Q" campaign in Germany—European railway news

In exercise of his powers under Regulations 55 and 56 of the Defence (General) Regulations, 1939, the Minister of War Transport on January 28 made the Limitation of Packages by Passenger Train Order, 1942, which orders that no package exceeding 1 cwt. in weight shall be accepted by any railway undertaking for conveyance by passenger train unless the consignor or his agent has made a prior arrangement with that undertaking for its acceptance. The obligation and limitations imposed with respect to any railway undertaking by any Act or other instrument determining its functions is relaxed accordingly. This Order came into force on Monday last, February 16.

Manchester Railway Station Canteen

A canteen for members of the Forces, established at Central Station, Manchester, by members of the Soroptimists Club, was opened on February 9 by the Lady Mayoress, Mrs. Wright Robinson. More than 2,000 cups of tea have been served weekly from a snack trolley which the Soroptimists maintained at Central Station and it is to supplant this that they have raised money to establish the canteen in a permanent building.

Route Numbers on London Trams

Because of lighting regulations, it has not been possible satisfactorily to illuminate the side route numbers on tramcars of the London Passenger Transport Board. A further difficulty has been that some women conductors cannot reach the route number boxes to change the number plates. Plates, 11 in. by 10 in., are now being

fitted at the right-hand corner of the rear window near the platform step, and the present interior lighting of the tram gives sufficient light to enable the numbers to be seen at night. To make them more conspicuous by day a white background is being painted on the window glass behind them. Some 250 cars are now being equipped with the new numbers, and all trams and trolleybuses will carry them in the near future.

Southern Railway Preparedness in Civil Defence

Of a total Southern Railway staff of 62,000, more than 44,000 have so far received A.R.P. training, 13,000 before and 31,200 since the war began. In addition, 850 men have been given instruction and are fully qualified in spotter's duties. These achievements are due mainly to the help of the A.R.P. instructors, some of whom have now re-joined their departments or enlisted in the Forces. In addition, an extensive scheme for training Fire Guards is being carried out, and already 8,000 Southern Railwaymen have been fully instructed in firewatching and elementary firefighting duties.

Central Wagon Control

The good work accomplished by the Central Wagon Control of the British railways is indicated by the improvement which is being made in the average round trip time of wagons, which has been reduced by four-fifths of a day. Nevertheless, there are still more than 60,000 wagons remaining unloaded after 48 hours. During the latter part of 1941, some 13,750,000 loaded wagons were forwarded on the railways, an increase of 1,110,000 wagon loads. The centralised control of all wagons, vans, sheets, and ropes, has enabled emergencies to be met with greater flexibility, and the allocation of special types of wagons and containers has been expedited.

By closer collaboration between the railways and the collieries, more intensive supervision is exercised, and a wagon allowance scheme has been adopted, under which the supply of wagons to collieries is equated between the coal districts and collieries according to output. In one area alone the output of coal has been increased by 100,000 tons a week.

Charges for Government Traffic

The Minister of War Transport, in pursuance of his powers under Regulation 56 of the Defence (General) Regulations, 1939, made on January 28 the Railways (Charges for Government Traffic) Order, 1942. This provides that, where an agreement has been entered into between a railway company named in the Railway Control Order, 1939, and a Government department in respect of the charges to be made by the railway company against the department for the carriage of merchandise, the railway company may make charges in accordance with that agreement notwithstanding any obligations or limitations to the contrary imposed by any Act or other instrument determining the functions of the railway company. Such charges shall not require the approval of the Railway Rates Tribunal, and the obligations imposed upon a railway company in respect of an agreed charge by Section 37 of the Road & Rail Traffic Act, 1933, shall not apply to the charges authorised by this Order, but a railway company shall in respect of such charges be exempt from the Statutory obligations from which it is exempt in respect of charges agreed and approved under that section.

Baldwins Deliver First 60-Ton Tank in U.S.A.

On December 8 the Baldwin Locomotive Works formally delivered the first 60-ton tank built in the United States; the occasion was marked by a gathering of some 350 leading industrialists and War Department officials. The tank was put through a two-hour demonstration, including a mock battle in which smaller tanks participated. The 20,000 employees of the Baldwin group of companies are now, it is claimed, almost all engaged directly or indirectly in war work.

American Balance of Production and Transportation

Addressing the American Society of Mechanical Engineers on December 4, Mr. Ralph Budd, President of the Chicago, Burlington & Quincy Railroad, who is in general charge of transportation for the Government, stressed the need for maintaining the present balance between transportation and production by allotment of sufficient material to keep existing equipment in good order and, before October next, to increase by 1,000 the numbers of locomotives, and bring up to 1,800,000 the stock of wagons owned by



New rear-window route number now being adopted for London Transport tramcars. Note the new trousered uniform of the woman conductor

Gewaltig sind die Aufgaben der Deutschen Reichsbahn gewesen. Weit über die Grenzen des Großdeutschen Reiches hinaus spannt sich



heute das Verkehrsnetz. Von der Meisterung der gestellten Aufgabe hängt Entscheidendes ab für die kämpfende Truppe und für die Heimat.

Fast 5 mal so groß wie vor dem Kriege ist heute der Arbeitsbereich des deutschen Eisenbahners...



... und trotzdem darf der lebenswichtige Güterverkehr nicht leiden!

Die erste Aufgabe der Deutschen Reichsbahn ist der Dienst an der Wehrmacht, Truppen, Kriegsmaterial und Nachschub sind über gewaltige Entfernungen in kürzesten Fristen zu befördern. Damit auch der übrige Güterverkehr in großem Umfang aufrechterhalten werden kann, ist die Mitarbeit aller Verfrachter erforderlich.

Beachten Sie daher folgendes:

Jeder unnötige Bahnverkehr muß vermieden werden. Güterwagen müssen schnellstens beladen und ohne Verzögerung entladen werden. Güterwagen müssen räumlich und gewichtsmäßig bis zum letzten ausgenutzt werden. Durch eine besondere Verordnung ist gesetzlich festgelegt: Eisenbahngüterwagen sind innerhalb der festgesetzten Fristen zu be- und entladen, insbesondere

auch in den Mittagsstunden, sowie sonnabends, sonn- und feiertags, mit Ausnahme des 1. Januar, des 1. Ostertages, des 1. Pfingsttages und des 25. Dezembers.

Die Deutsche Reichsbahn kann zu Zwangsentladungen und zur Zwangszuführung schreiten, wo es im Interesse der pünktlichen Versorgung von Wehrmacht und Bevölkerung notwendig erscheint.

Auf jeden Wagen kommt es an!

HILF DER DEUTSCHEN REICHSBAHN UND DU HILFST DIR SELBST!

A "Q" campaign in Germany. A new Reichsbahn advertisement stressing the need for rapid loading and discharge (See paragraph opposite)

the railways. This programme of building, he said, entailed an outturn of 12,500 cars a month, whereas present shortage of material limited it to 6,000. Recent U.S.A. rolling stock totals were given at page 232 of our February 13 issue.

Petrol Rationing in Canada

Under a new petrol rationing scheme which comes into operation on April 1, the ordinary motorcar driver in Canada will receive coupons valid for 5 gallons each, enabling him to obtain approximately 1 gallon of petrol a day. The coupons will be available by buying a licence and a coupon book which will cost \$1. The total ration will consist of an annual quantity varying between 300 and 380 gallons, estimated to afford some 5,400 miles. Preferred categories of drivers such as doctors, ministers of religion, nurses, commercial travellers, and so forth, will be authorised to secure larger amounts depending on their needs, but they will have to provide proof of real need. Commercial vehicles, such as buses, taxis, motor lorries, and ambulances, are not affected by the rationing.

Trans-Canada Air Lines in 1941

As the need for fast movement of men, mails, and materials between war production centres became more pronounced, the activities of the Trans-Canada Air Lines reached new high levels during 1941. The company extended its transcontinental route 118 miles from Moncton to the Atlantic Ocean port of Halifax in April, and this has been of great national service. It also added an additional daily round trip between the Maritimes and Montreal so that Trans-Canada now gives service twice daily in each direction over the 3,200 miles of its main line from coast to coast. Fulfilling an agreement made between Canada and the United States respecting international air services, the company began operations from Toronto to New York in May; the service is performed non-stop, covering the 365 miles in two hours. Against 15,000 miles daily at the opening of the year 1941, Trans-Canada today operates more than 19,000 miles a day. Over the whole system the increase in the volume of traffic was considerable. In January, 1941, the company carried 4,190 passengers; six months later the number had doubled. Some 75 per cent. of the passengers are travelling on business directly connected with the war effort. The growth of air mail transport has also been great. From 83,460 lb. carried in

January, 1941, the figure has grown steadily, and today approaches a monthly load of 140,000 lb. Mail pay rates were reduced from 60 cents to 45 cents a mile as from April 1 last. Air express has almost trebled the total of 6,880 lb. for the opening month of the year 1941. Expanding war production is responsible for the rapidity of these increases.

Two of the Trans-Canada aircraft were requisitioned for war service in mid-summer, and the company's fleet now consists of 18 Lockheed twin-engined aircraft. The company's aircraft are perhaps the most intensively used machines of any air line in North America. They are also subject to as comprehensive a maintenance programme as any in the world. After 200 hours in service every machine is taken out of service and thoroughly overhauled. The procedure is adhered to rigidly and necessarily limits the extent of the company's operations, until such time as additional aircraft are available. Improvements were carried out by the Canadian Department of Transport during 1941 to airport and airway facilities across the Dominion. All airports used by the company are now under the management of that Department. St. Hubert Airport Montreal, is now given over entirely to military operations, and a new airport for Montreal at Dorval has been opened to commercial operation; the Trans-Canada operations were transferred to the new airport on September 1, 1941.

Trans-Canada continues to overhaul flight instruments and metal propeller units for the Royal Canadian Air Force; to overhaul military aircraft at Toronto; and afford en route servicing to military aircraft. In recent weeks the company has also undertaken to overhaul aircraft engines and accessories under contract to the Canadian Department of Munitions & Supply. That Department is at present erecting, adjacent to the company's Winnipeg shops, a large building, 100 ft. by 250 ft., in which the work will be performed. The company is re-arranging its own facilities so that no delays occur. As with other industries, Trans-Canada finds many of its employees in the fighting services. In many instances they have been replaced by women, who have given excellent service even in exacting technical shop work.

The full development of the Trans-Canada plans to supply essential air services is necessarily being affected by the course and circumstances of the war. The company expects that its services to Newfoundland and Alaska, the provision of which has been decided

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upon, will be inaugurated as soon as aircraft of the appropriate type can be obtained. The working arrangements between Trans-Canada Air Lines and the British Overseas Airways Corporation become closer as the demands of war on the companies increase.

A "Q" Campaign in Germany

On the opposite page we reproduce an advertisement recently published in Germany by the Reichsbahn, stressing the German war effort and stating that the field of activities of the German railwaymen is nearly five times greater than before the war. Enormously increased are the tasks of the German Reichsbahn. The traffic system is extending far beyond Greater Germany's frontiers. The achievement of the task is vitally important (*Entscheidendes*) for the fighting forces and for the home country, and, nevertheless, essential goods traffic must not suffer. The first duty of the Reichsbahn is servicing the forces. Troops, war materials, and supplies must be conveyed over great distances with minimum delays. With a view to enabling the remaining goods traffic also to be maintained as far as possible, the collaboration of all users is required. Therefore bear in mind the following points: All unnecessary railway traffic must be avoided. Goods wagons must be loaded and unloaded speedily and without delay. Carrying capacity of goods wagons must be used to the utmost. A special decree orders loading and discharge within specified time limits, also during mid-day hours as well as on Saturdays, Sundays, and holidays, except on January 1, Easter Day, Whitsun Day, and December 25. The German Reichsbahn is entitled to enforce compulsory discharge and delivery of goods if such is deemed necessary in the interest of the punctual provisioning of the armed forces and of the civil population. Every wagon is of the utmost importance. Help the German Reichsbahn and you help yourself." Earlier reference to this campaign for quicker loading and unloading of goods wagons was made at page 102 of our January 16 issue.

German Goods Traffic and Wagon Stocks

The total of goods wagons owned by the Reichsbahn in 1937 (the last year for which we have received complete figures) was shown as 595,360; the 1939 figure for the State Railways of Bohemia & Moravia was 61,222. Details have just reached us through a neutral source of a recent survey of the goods wagons at present in the hands of the Reichsbahn and the Bohemian-Moravian State Railways, showing the combined total as 1,000,000 wagons, of which 800,000 are in actual use. It is estimated that some 70,000 wagons have been sent to the Eastern Front with a view to serving as "winter quarters" for the German army shelterless in the vast regions ravaged by the "scorched earth policy," while it is calculated that about 30,000 wagons at a time are in repair shops and overhaul sheds. About 120,000 wagons are believed to be circulating in German-occupied or German-controlled countries. Up to January 17, 4,003 wagons had been rushed up to the German army retreating in the East, with supplies of woollen articles resulting from the recent collection in Germany.

With a view to easing the heavy pressure on its goods rolling stock, the Reichsbahn has endeavoured, from the early days of the war, to divert as much traffic as possible to the inland waterways, and the goods traffic conveyed by the German inland shipping services at the end of 1941 equalled about one quarter of the volume of goods conveyed by the Reichsbahn. In its policy to force goods transport on to the inland waterways, the Reichsbahn goes so far as to refuse wagons for full loads between places served by waterways. Due mainly to the heavy increase in the conveyance of cereals, sugar beets, industrial potatoes, coal, ores, and other heavy commodities in bulk, German inland shipping tackled a goods volume in 1941 which exceeded the 1940 volume by about 20 per cent.

This increased use of inland water transport seems to have been the cause of the recent drastic curtailments in German rail services. As we recorded at page 175 of our January 30 issue, reductions of railway passenger traffic all over Germany came into force on January 18, in accordance with an announcement suddenly issued on January 16. Goods facilities seem to have been curtailed simultaneously. The reason given was that heavily-increased coal transport had to be handled because of the continued period of frost, the traffic over the inland waterways (which deal with a considerable volume of coal transport) being reduced through ice formation. At that time it was thought that water traffic might have to be suspended altogether through the rivers and canals freezing. With the increasing severity of the cold spell it is possible that this occurred, as a press message from Zurich dated January 28 (see page 211, February 6 issue) said that all commercial railway goods traffic in Germany had been stopped until further notice.

Curtailment of Finnish Railway Services

A further drastic curtailment of the passenger and goods train services in Finland came into force on January 25.

Hanko Train Services Reported Resumed

Railway services between Hanko and other Finnish towns were resumed on February 2, according to a Helsinki message to the

Official Italian News Agency. It was reported some time ago that the Russian garrison at Hanko had been evacuated owing to the onset of winter.

Road Services of the Swedish State Railways

A reorganisation of the road motor traffic of the Swedish State Railways took place at the end of 1941, in order to effect closer co-operation than heretofore between the road and rail branches of the administration. The State Railways at present possess concessions for the operation of road motor services aggregating 9,000 km. (5,590 miles), but only 7,500 km. (4,660 miles) are being worked at present. Further reductions of the State Railways' bus services, due to the shortage of motor fuel and to the necessity of saving tyres, came into force on January 12.

Swedish State Railways to Increase Tariffs

According to the Royal Address in Stockholm at the opening of the new parliamentary session on January 12, the financial situation of the country requires additional income in connection with defence expenditure. Among other sources of revenue is envisaged an increase in the passenger fares of the State Railways by 10 per cent. On the other hand, with a view to reducing expenditure, the electrification of the State Railways will be retarded appreciably, beginning with the Hälsingborg-Hässleholm and Hässleholm-Eslöv lines. The cost of the new day ferry for the Malmö-Copenhagen service, originally fixed at Kronor 4,000,000, is now estimated at Kronor 5,500,000, due to the considerable increases of the prices of building materials and so forth.

Further Swedish Road Traffic Control

Because of the shortage of motor fuel and lubricants in Sweden, new regulations came into force on February 1, reducing the maximum working radius of motor lorries (calculated from their home bases) from 75 km. (46½ miles) to 40 km. (25 miles). Moreover, lorries are not allowed to convey goods over distances exceeding 50 km. (31 miles). Exception is made in respect of the territory to the north and west of the Bräcke-Storlien and Bräcke-Karungi railway lines. Bräcke is the junction between the Stockholm-Storlien (Swedish-Norwegian frontier)-Trondheim, and the Stockholm-Haparanda (Swedish-Finnish frontier) lines. Karungi is the terminus of the extension leading from Haparanda northwards along the border. In these northern provinces the railway system is less developed and motor traffic cannot there be subjected to the same limitations as in regions better served by rail. Other exceptions (applying in all districts) concern motor lorries regularly conveying milk from the dairy centres, or livestock to slaughter houses; such vehicles are allowed a maximum working radius of 100 km. (62 miles).

No maximum radius or working distance has yet been introduced for private cars and buses.

Balkan Railways

Under an agreement between the German and Roumanian Governments and Railway managements, Roumania is to spend 70,000 million Lei (approximately £100 million) on new railway works in 1942. Germany will supply track materials and rolling stock to a value of RM. 25 million marks (£1.2 million), on credit at 3½ per cent. interest per annum. By a similar agreement the Bulgarian Government has been instructed to spend 2,700 million Leva (approximately £10 million) on new rolling stock.

Plans are under discussion for the operation of a new ferry route between Calafat on the Roumanian shore, and Vidin on the Bulgarian shore. The construction of a bridge, here, which has been under consideration for some time, is believed to have been found too costly. The new route is being designed to shorten the rail distance between Sofia and the eastern parts of Central Europe.

The first section (10 km. in length) of the Bumbesti-Livazani line, now under construction, was opened in December last between Bumbesti and Meri. Realignment, track improvements, and bridge strengthening, was reported to be well advanced on the Filiashi-Bumbesti line. When completed, the new works will form a new connecting link between the two East-West main lines of Roumania, in addition to serving the coal mining area of Petrosani on the Meri-Livazani section.

It is reported that 300 goods wagons ordered by the Yugoslav State Railways before the invasion, and now under construction at the Slav Brod wagon works, will shortly be delivered to the Croatian State Railways.

The Serbian State Railways increased all passenger fares and goods rates by 50 per cent. from January 1, 1942, with the exception of rates for grain, ores, and coal, which have been increased by 20 per cent. only. Earlier reports of smaller percentage increases were recorded at page 27 of our January 2 issue.

"Free Italian" Railway Workers in Persia

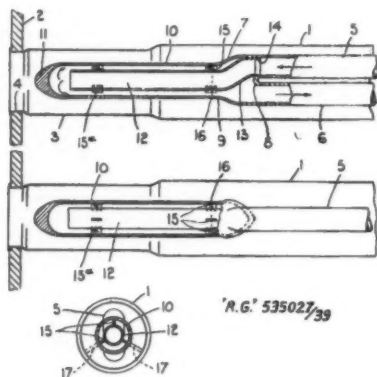
Anti-Fascist Italians in Teheran—mostly railway workers—are stated to have formed a "Free Italian Committee," according to a Reuters message of February 11.

ABSTRACTS OF RECENT PATENTS*

No. 535,027. Superheater Elements

The Superheater Co. Ltd., of Bush House, Aldwych, London, W.C.2. (A communication from Schmidt'sche Heissdampf-G.m.b.H., of Rolandstrasse 2, Kassel-Wilhelmshöhe, Germany.) (Application date: September 25, 1939.)

A steam superheater element of the smoke tube type consists of a tube loop comprising limbs 5 and 6, the ends of



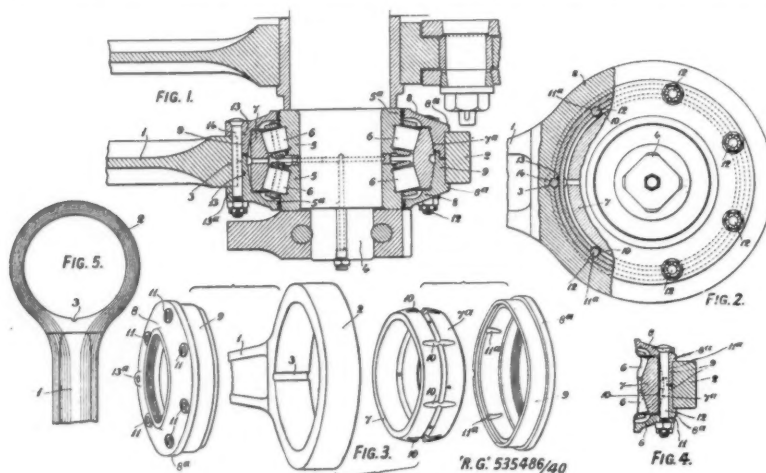
which are united to form a breeches-like forging having a waist portion 7 and a bridge 8. The smoke tube 1 is secured into the boiler tube plate 2, and has a relatively long portion 3 of reduced diameter, and a further short portion 4 of still further reduced diameter. In producing the breeches forging the method of specification No. 6304/15 or specification No. 355414 may be used, the waist portion 7

tube to position tube 12 in tube 10, and to locate end 9 and tube 10 for butt welding 16. If desired radial lugs 17 may be used to support the element in the smoke tube 1 near its fire box end.—(Accepted March 26, 1941.)

No. 535,486. Coupling Rods

British Timken Limited, and Eldred Herbert Doughty, all of Cheston Road, Aston, Birmingham, 7. (Application date: January 17, 1940.)

The big-end of a locomotive connecting rod 1 consists of a solid forged eye 2 with a groove 3 across the inner periphery, the "grain" or "flow" of the metal being as indicated in Fig. 5. Between the eye 2 and the crank-pin 4 there is a bearing assembly comprising a double-row tapered roller bearing composed of inner cone bearings 5, two laterally spaced rows of tapered rollers 6, and a single outer bearing ring 7, which has a spherical exterior surface 7a for self-alignment. Enclosing the bearing are two covers 8, which surround ribs 5a on the two inner bearing races. These covers have extensions 9, which fit closely within the eye 2 and are spigoted together. The covers 8 are also extended radially to form flanges 8a, which embrace the side faces of eye 2. To prevent rotation of bearing member 7 about the crank-pin 4, the surface 7a has a number of grooves 10. Corresponding holes 11 are drilled in the covers 8 to pass through the extensions 9 to form grooves 11a. Bolts 12 pass through the holes 11 and enter grooves 10. At the same time the bolts 12 hold the covers 8 together and clamp their outer flanges 8a against the connecting-rod eye 2. In order to lock the spherical bearing housing to the eye 2, aligned grooves 13 are formed across the



being brought to circular section and swaged down to the required diameter at its free end 9. At the fire box end there is a field tube portion comprising an outer tube 10 with one end 11 closed and thickened, and an inner tube 12. Tube 12 is entered into the end of the bore of tube 5 at the end remote from the closed end 11 of tube 10. The end portion 13 of tube 12 is offset so that tube 12 may be axially aligned in tube 10. Within tube 5 the end of tube 12 is preferably chamfered, as at 14. Radial lugs 15, 15a are welded to the

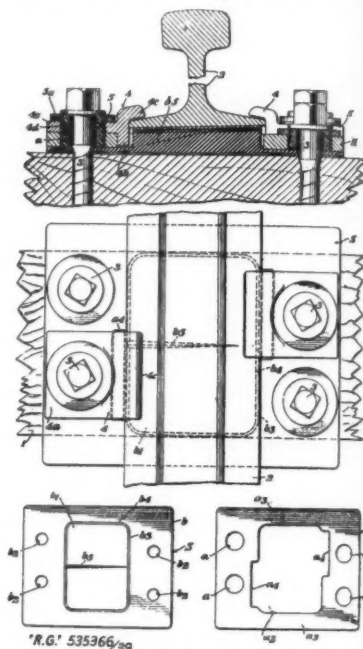
cover extensions 9 and extended through the side flanges to form holes 13a. A bolt 14 is passed through the holes 13a and rigidly keys the parts together.—(Accepted April 10, 1941.)

No. 535,366. Tie Plate

Resilient Products Corporation, of 79, Madison Avenue, New York, United States of America. (Convention date: February 3, 1939.)

A tie plate arrangement consists of a metal harness jacket H with rib sections

a³ and passages a and a², the latter being enlarged at a⁴. The passage a² is for reception of a resilient cushion section b¹ forming a seat for the rail 2. The cushion b¹ is a section of shoe S which comprises a sole b with a number of passages b². Section b¹ comprises a lower inclined section b³ and an upper wall surface b⁴. Across the section b¹ there are one or more grooves b⁵. The shoes S are placed adjacent each end of the sleepers 1, a harness jacket H being associated with each shoe S. Screw spikes 3 are passed downwards through aligned passages b² and a to secure the tie plate assembly to the sleeper. Lateral movement of the rails 2 is prevented by lock clips 4, each comprising a base 4a, a depending locking section 4b and an upper clamping section 4c. The passages 4d are



aligned with the corresponding passages a and b². The locking section 4b are received by the adjacent passage a⁴, and the clamping section 4c forms the upper part of a pocket into which the base of the rail 2 is received. The shoes S may be of resilient material such as natural rubber. Each set of aligned passages 4d, a and b² should then be lined with a resilient sleeve 5 having a flange 5a.—(Accepted April 7, 1941.)

COMPLETE SPECIFICATIONS
ACCEPTED

535,063. Schweizerische Lokomotiv und Maschinenfabrik. Devices for maintaining subatmospheric pressure in the crank case of piston engines.

534,994. Towle, E. L. N., Walsh, A., and Metropolitan-Vickers Electrical Co. Ltd. Starting arrangements for induction motors.

536,401. Sandberg, C. P., Sandberg, O. F. A., and Humfrey, J. C. W. Manufacture of railway and tramway rails.

536,419. Symington-Gould Corporation. Cushioning side bearing for railway vehicles.

536,426. King Limited, G. W., and King, D. M. Trolleys for overhead runways and the like.

536,352. Worcester Windshields & Casements Limited, and Bushnell, F. Sliding windows and doors.

* These abridgments of recently published specifications are specially compiled for THE RAILWAY GAZETTE by permission of the Controller of His Majesty's Stationery Office. The full specifications can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, price 1s.

Argentine Railways' Note to Government

As was briefly recorded in our last week's issue, representatives of the foreign railways in Argentina have submitted a lengthy memorandum to the Minister of Public Works seeking relief from the disabilities under which the companies are now suffering. The memorandum points out that despite decisions of the Supreme Court admitting the right of the railways to protection of their invested capital and legitimate return on that investment, the railways are witnessing the slow destruction of their property in which 1,487,265,000 gold pesos are invested.

The railways point out that the annual provision for renewals is now down to little more than 10 per cent. of the total laid down by law. Therefore, they assert, "the efficiency of the services will diminish and the marketing of products will every day prove more difficult. It cannot be in the mind of any citizen that to allow the railways to depreciate will enable them to be bought cheaper since the difference in price will be represented by depreciation which would have to be covered by means of new purchases to restore the efficiency of the service."

The memorandum recalls that notes were presented to the Argentine Government in 1940 and 1941 suggesting practical measures to meet the crisis, including the granting of a special rate of exchange and an increase in cattle and freight rates, but that nothing has been done.

Exchange losses in 1941 totalled 24,209,000 pesos and the exchange margin between buying and selling rates imposes, the memorandum asserts, a tax equivalent to 15.3 per cent. on net receipts used by the railways to meet financial services and 9.8 per cent. on the funds employed for the purchase of materials.

The debenture stocks of the British railways now call for 74,293,344 pesos at 16 to the pound compared with 53,166,174 pesos at 11.45 and this has made necessary a moratorium on all except one company; no dividends have been paid since 1930.

The memorandum concludes that the National Railways Board Report was delivered to the Government in November, 1940, but its study had made no headway and discussion of the measures proposed is being retarded for no apparent reason. Therefore the companies ask for sanction of the measures requested by the railways without further delay, reserving their rights for the recovery of loss and damages.

Questions in Parliament

Western Avenue Extension

It is hoped to complete the extension of the Western Avenue, by-passing Uxbridge, during the coming summer. Meanwhile the work has been going forward, and in consequence the plant on the site has not been idle. (Mr. P. J. Noel-Baker, February 11.)

Reinstatement of Railwaymen

The position of railwaymen is safeguarded for reinstatement when they return to civilian life if such railwaymen have voluntarily joined the Armed Forces. Men who have volunteered for service will be treated in the same way in this respect as men called up for service under the National Service Act, provided that the volunteers enlisted with the consent of the railway company concerned. The case of any man

who enlisted without the permission of the company will be considered on its merits on the man's discharge. (Mr. P. J. Noel-Baker, Joint Parliamentary Secretary to the Ministry of War Transport, February 11.)

Parliamentary Notes

Indian Railway Bill

The Bombay, Baroda & Central India Railway Bill was read a second time on February 10, and referred to the Examiners of Petitions for Private Bills.

Staff and Labour Matters

Railway Wages

The Railway Staff National Tribunal commenced the hearing of the claims of the National Union of Railwaymen and the Railway Clerks' Association on Monday, February 16, at Egginton House, London. The constitution of the tribunal was Sir John Forster (Chairman), Sir Charles Bruce Gardner (member nominated by the railway companies), and Mr. J. Hallsworth (member nominated by the trade unions).

The tribunal was assisted by four assessors. Mr. E. J. Missenden, General Manager, Southern Railway, and Mr. Kenelm Kerr, Assistant General Manager (Staff), London & North Eastern Railway, were nominated by the railway companies, and Mr. F. J. Burrows, President of the National Union

hear and decide the following claims of the Railway Clerks' Association:—

1. That as a war-time measure:—
 - (a) The class 5 male clerical scale be extended by two annual increments of £10, to a maximum of £220 per annum at age 33;
 - (b) The appropriate adjustments be made to the class 5 salary scales for stationmasters, etc., and supervisors, to provide for a maximum of £220 per annum so that at the end of the fourth year of service in the 5th class the occupant would proceed to a salary of £210 per annum, and at the end of the fifth year he would receive a further advance to £220 per annum;
 - (c) The class 2 women clerks' scale be extended by three yearly increases of 2s. 6d. a week to a maximum of 67s. 6d. a week at age 34.
2. That in cases where women clerks are performing duties similar in character and value to those of male clerks, they should be paid in accordance with the male clerical staff agreement.

The Railway Clerks' Association and the railway companies agree that the decision of the Railway Staff National Tribunal on the issue shall be final and binding upon the parties.

Postwar Planning and Transport

Mr. W. H. Ansell, M.C., President of the Royal Institute of British Architects, was the principal guest at a luncheon given by the Institute of Transport at the Connaught Rooms, London, W.C.2, on February 11. Mr. J. S. Nicholl, C.B.E., President of the institute, was in the chair.

Mr. Ansell, in the course of an address on "Postwar Planning and Transport," said that in all plans which might be made for the future it was essential that transport should be taken into account from the very first. Transport should be the servant of the public, and not its master, and it was an integral part of civic life. Life was not, and should not be, made a matter of pedestrian *versus* road transport, or railways *versus* road. The nation had need of every kind of transport, and the perfect plan would have to take them all into account.

Dealing with some of the problems which face those who were to plan the rebuilding of some of our towns and provide for communications between them, Mr. Ansell said that the care which was taken to safeguard railway level crossings was even more necessary in the case of certain of our major roads which, in many cases, were in effect level crossings along considerable portions of their length. Treating some of the problems which will have to be faced in the rebuilding of areas which had suffered from enemy air attack, Mr. Ansell said that railway stations and marshalling yards were a potent factor in deciding the situation of markets, and that those entrusted with planning for the future must contemplate the possibility of changed railway terminal positions and other things which had come to be looked upon as fixed.

In a model State transport would move more rapidly, not because of increased speed, but because of absence of delays. He emphasised that in taking action for postwar development and reconstruction there must be no possibility of laying down a plan and then saying, "now let us consider transport." Transport was among the factors which must be taken into consideration in the initial stages.

THE SALVAGE OF WASTEPAPER
IS A
VITAL CONTRIBUTION
TO THE
NATIONAL WAR EFFORT

ECONOMY IN THE USE OF
ALL FORMS OF PAPER
IS A
NATIONAL SERVICE

of Railwaymen, and Mr. F. C. Watkins, M.P., President of the Railway Clerks' Association, were nominated by the trade unions.

The claims were presented to the tribunal by Mr. J. Marchbank, General Secretary, on behalf of the National Union of Railwaymen, and by Mr. C. N. Gallie, General Secretary, on behalf of the Railway Clerks' Association. Mr. G. L. Darbyshire, Chief Officer for Labour & Establishment, London Midland & Scottish Railway, and Chairman of the Railways Staff Conference, replied on behalf of the railway companies.

The terms of reference to the Tribunal were as follow:—

N.U.R. claim.

To ask the Railway Staff National Tribunal, established under appendix, Part VI, of the agreement in regard to machinery of negotiation for railway staff dated February 26, 1935, to hear and decide the following claim of the National Union of Railwaymen:—

That the minimum rate of wages payable to any adult railway employee, male or female, shall be not less than £3 a week, exclusive of any war wage or bonus granted since the commencement of the war.

The National Union of Railwaymen and the railway companies agree that the decision of the Railway Staff National Tribunal on the issue shall be final and binding upon the parties.

R.C.A. claim.

To ask the Railway Staff National Tribunal, established under appendix, part VI, of the agreement in regard to machinery of negotiation for railway staff dated February 26, 1935, to

Notes and News

L.M.S.R. Coronation Engine back from U.S.A.—The stream-lined locomotive *Coronation* of the L.M.S.R. Coronation Scot train which toured the U.S.A. in 1939 before being exhibited at the New York World's Fair, has returned to this country.

A Bus Company Acquisition.—The City of Oxford Motor Services Limited, an associate of the G.W.R., has acquired control of Blue Coaches (Bedford) Limited. The latter operates a regular motorcoach service between Oxford and Bedford, and is being conducted for the time being as a subsidiary company.

Ambulance Presented by Argentine Railwaymen.—At the County Hall on February 11, Sir Follett Holt, Chairman of the Entre Rios and Argentine North Eastern Railway Companies presented an ambulance subscribed for by the non-British employees of the two railways to the London County Council.

Great Southern Railways (Eire).—For the 5th week of 1942 the Great Southern Railways (Eire) reports passenger receipts of £30,927 (against £33,927), and goods receipts of £60,597 (against £49,903), making a total of £91,524, against £83,830 for the corresponding period of the previous year. The aggregate receipts to date are passenger £155,364 (against £160,542), goods £314,380 (against £247,376), making a total of £469,744 (against £407,918).

Fatal Accident near Sheffield, L.N.E.R.—Late in the evening of February 11 a train on the L.N.E.R. carrying troops came in contact near Beighton station, south of Sheffield, with an obstacle, apparently projecting from a goods train on an adjacent line, with the result that the sides of several carriages were ripped open. Fourteen men were killed or fatally injured and 36 injured. Rescue work was effected as quickly as possible. The cause of the accident is under investigation. The inquest was opened at Beighton on February 14.

Railway Benevolent Institution.—The institution has received through Mr. W. J. Jordan, the High Commissioner for New Zealand, a cheque for £250. The gift is an expression of appreciation by the railwaymen of New Zealand of the way in which railwaymen here have stood up to the demands which have been made on them by the war, especially from the air. The Hon. Robert Semple, New Zealand Minister of Railways, sent his greetings to the railwaymen and expressed his admiration of their fine work in keeping the lines clear and maintaining the services.

Westinghouse Brake & Signal Co. Ltd.—At the ordinary annual general meeting of the company, held in London on February 10, Lord Southborough, the Chairman, who presided, said that every department in the company's business had been very fully occupied, and the total output had been on a high level. Referring to the fact that cash at banks and in hand had reached £441,088, he said that between September, 1941, and January, 1942, the company was faced with demands for large payments of taxation. There was also the dividend to be paid and members would agree that with production at a high level and many uncertainties resulting from the war, it was necessary to maintain a sub-

stantial cash account. It had been found to be very beneficial from the company's point of view. Captain B. H. Peter, Managing Director, said that on the question of exports it was essential to realise the increasing difficulties, and everyone who knew about the position was prepared to face the fact that export work could be carried out only on a very small scale and then only for the purpose of providing essential goods.

Accident near Thirsk, L.N.E.R.—The 10.15 p.m. express from King's Cross, L.N.E.R., on February 13 was in collision with a goods train near Thirsk early the next morning, but there were no casualties. The locomotive and some wagons were derailed and the goods brake-van considerably damaged, but the guard was not in it at the time.

Inquiry into Cowlairs Accident, L.N.E.R.—As briefly announced in our last week's issue, Colonel A. C. Trench opened at Glasgow on February 9, the formal inquiry for the Minister of War Transport, into the collision, which occurred at Cowlairs, L.N.E.R., on January 30, between a passenger train and a light engine. The L.N.E.R. officials present were: Mr. R. J. M. Inglis, Divisional General Manager (Scottish area); Mr. R. Gardiner, Superintendent (Scottish area); Mr. W. Y. Sandeman, Engineer (Scottish area); Mr. E. D. Trask, Locomotive Running Superintendent. Evidence was given by station officials concerning the marshalling of the leading vehicle in the express which was running with the guard's-van portion at the rear and the passenger compartments next to the locomotive. The driver of a military special, which had just arrived on the up branch, and who proceeded forward with his engine, when it was uncoupled, spoke to seeing the light engine on the down line and the signals lowered for the train which ran into it. He whistled to attract attention to the error. Mr. Gardiner paid a high tribute to the work of the rescue parties. As also intimated in last week's issue, Colonel Trench decided to continue the inquiry in private.

Railway Companies and Thomas Cook & Sons Limited.—Notice is given that application has been made to Parliament by the four main line railway companies for an Act to be called "Railway Companies (Thomas Cook & Son Ltd. Guarantee)" for purposes which include the following:—Power to the railway companies to give guarantees in relation to agreements, obligations, or undertakings entered into by Hay's Wharf Cartage Co. Ltd. with respect to the acquisition from the Custodian of Enemy Property of the share capital of Thomas Cook & Son Ltd., and in connection therewith to make payments, or advances, and to enter into agreements of this kind. Copies of the Bill for the intended Act may be inspected at the office of Mr. I. Buchanan-Pritchard 4, Cowley Street, Westminster, S.W.1, Chief Legal Adviser, G.W.R. and L.N.E.R., Mr. A. Eddy, Watford, Chief Legal Adviser, L.M.S.R.; Mr. H. L. Smedley, Waterloo Station, London, S.E.1., Solicitor, Southern Railway; Beale & Co., 22, Great Smith Street, Westminster, S.W.1, Parliamentary Agents; and Sherwood & Co., Hallam House, 3, Central Buildings, Westminster, S.W.1, Parliamentary Agents. In our issue of August 8, 1941, at page 126, we recorded that the railway companies were negotiating to obtain control of Thomas Cook & Son Ltd.

Argentine State Railways.—A Decree recently issued by the Argentine Government authorises the State railways to buy railway material up to a value of 10,000,000 pesos in any available market. The Government has also announced that it has sent a message to Congress seeking approval for an appropriation of 20,000,000 pesos for the State railways. This is the total sum required of which half is needed immediately.

British and Irish Railway Stocks and Shares

Stocks	Highest 1941	Lowest 1941	Prices	
			Feb. 13, 1942	Rise/ Fall
G.W.R.				
Cons. Ord.	43½	30½	43	- 2
5% Con. Pref.	109½	83½	110½	—
5% Red. Pref. (1950) ..	105½	96½	106	—
4% Deb.	113½	102½	114½	—
4½% Deb.	115	105½	114½	—
4½% Deb.	121½	112	122½	—
5% Deb.	132	122	133	—
2½% Deb.	70	62½	69	—
5% R. Charge	129½	116	130½	+ 1
5% Cons. Guar.	128	110½	129½	—
L.M.S.R.				
Ord.	17½	11	17½	- 1
4% Pref. (1923)	53	33½	52	- 1
4% Pref.	68½	48½	70	+ 1
5% Red. Pref. (1955) ..	97½	77	96½	+ 1
4% Deb.	105½	97	106	+ 1
5% Red. Deb. (1952) ..	110½	106½	109½	—
4% Guar.	100	85½	101½	—
L.N.E.R.				
5% Pref. Ord.	3½	2½	3½	- 1
Def. Ord.	2	1½	2½	- 1
4% First Pref.	52½	33	51	- 1
4% Second Pref.	19½	10	20	—
5% Red. Pref. (1955) ..	79½	52	82	+ 1
4% First Guar.	90½	74½	92½	—
4% Second Guar.	80½	59	82½	—
3% Deb.	79½	68½	80	—
4% Deb.	104	91½	105	—
5% Red. Deb. (1947) ..	106	102½	104	—
4½% Sinking Fund Red. Deb.	103½	99½	102½	—
SOUTHERN				
Pref. Ord.	65½	43½	63½	- 1
Def. Ord.	15½	9	15½	- 1
5% Pref.	107	77½	107½	—
5% Red. Pref. (1964) ..	107	89½	107½	+ 1
5% Guar. Pref.	128	111	129½	—
5% Red. Guar. Pref. (1957)	114½	107½	114½	—
4% Deb.	112	102½	113½	—
5% Deb.	130½	119	133	—
4% Red. Deb. (1962- 67)	108½	102	107½	—
4% Red. Deb. (1970- 80)	108½	102½	107½	—
FORTH BRIDGE				
4% Deb.	99½	90½	101½	+ 3
4% Guar.	99	85½	101½	+ 1
L.P.T.B.				
4½% "A"	120½	109½	119½	—
5% "A"	130½	115½	129½	—
4½% "T.F.A."	103½	99½	100½	—
5% "B"	117	102	119½	—
"C"	46½	28½	40	—
MERSEY				
Ord.	24½	19½	22½	—
4% Perp. Deb.	100	90	99	—
3% Perp. Deb.	73½	63	72½	—
3% Perp. Pref.	58	51½	57	—
IRELAND BELFAST & C.D.				
Ord.	4	4	4	—
G. NORTHERN				
Ord.	14½	3	14	- 1
G. SOUTHERN				
Ord.	14½	5	10	- 1
Pref.	17	10	16	+ 4
Guar.	44	16	43	+ 1
Deb.	61	42	59½	+ 2½

Great Western Railway Company

NOTICE IS HEREBY GIVEN THAT THE ANNUAL GENERAL MEETING of the Proprietors of this Company will be held in London, at the Great Western Royal Hotel, Paddington Station, on Wednesday, the 11th day of March, 1942, at Half past eleven o'clock in the morning, for the general purposes of business.

NOTICE IS HEREBY FURTHER GIVEN THAT in pursuance of the Standing Orders of Parliament a SPECIAL GENERAL MEETING of the Proprietors of this Company will be held at the same place, on Wednesday, the 11th day of March, 1942, at Twelve o'clock noon—or as soon thereafter as the Annual General Meeting of the Company, convened for Half past eleven o'clock in the morning on the same day, is concluded or adjourned—for the purpose of considering and, if thought fit, of approving the following Bill intitled—

"An Act to empower the Great Western Railway Company the London and North Eastern Railway Company the London Midland and Scottish Railway Company and the Southern Railway Company to give guarantees and to make financial and other arrangements in connection with or arising out of the acquisition by Hay's Wharf Cartage Company Limited of the share capital of Thos. Cook and Son Limited; and for other purposes."

CHARLES J. HAMBRO, Chairman.
F. R. E. DAVIS, Secretary.

Paddington Station,
London, W.2.
16th February, 1942.

London and North Eastern Railway

NOTICE IS HEREBY GIVEN THAT THE Nineteenth Ordinary General Meeting of the Proprietors of the London and North Eastern Railway Company will be held at Grosvenor House, Park Lane, London, W.1, on Friday, the sixth day of March, 1942, at 2.0 p.m., for the purpose of the general business of the Company, including the determination of the Auditors' remuneration.

NOTICE IS ALSO HEREBY GIVEN that Major

W. H. Gardiner, one of the Proprietors of the Company, has given notice of his intention to move the following Resolution at this Meeting:—

"THAT each individual holder of either the Preferred Ordinary or Deferred Ordinary Stock in the Company be allowed free travel over his own Railway to the extent of eight miles of first class travel or twelve miles of third class travel yearly for each one pound nominal of either class of stock which he holds, provided that he has held this Stock for a period of at least one year previously, and that each holder of First or Second Preference Stock be allowed a similar privilege at the same rate to the extent that he may have received interest on his capital at a lesser rate than that to which he is entitled."

NOTICE IS HEREBY FURTHER GIVEN THAT in accordance with the Standing Orders of Parliament a Special or Extraordinary General Meeting of the Proprietors of the Company will be held at the same place on the same day at 3.0 p.m., or as soon thereafter as the business of the Ordinary General Meeting is concluded, for the purpose of considering and, if thought fit, of approving the Bill intitled:—

"An Act to empower the Great Western Railway Company the London and North Eastern Railway Company the London Midland and Scottish Railway Company and the Southern Railway Company to give guarantees and to make financial and other arrangements in connection with or arising out of the acquisition by Hay's Wharf Cartage Company Limited of the share capital of Thos. Cook and Son Limited; and for other purposes."

Dated this 18th day of February, 1942.

By Order,
P. J. DOWSETT,
Secretary.

Marylebone Station,
London, N.W.1.

WELL-KNOWN manufacturing firm on Government contracts specialising in components for railway rolling stock have vacancy on their Sales Staff for a Technical Representative. Applicants must have engineering training, with actual railway experience in

this country.—Write, giving full particulars of previous experience, age and salary required, to Box. No. 120, c/o RAILWAY GAZETTE, 33, Tothill Street Westminster, London, S.W.1.

Southern Railway Company

NOTICE is hereby given that the next ANNUAL GENERAL MEETING of the Southern Railway Company will be held at Beaver Hall, Garlick Hill, in the City of London, on Thursday, the 12th March, 1942, at 11.30 a.m., for the purpose of receiving the Accounts for the past year and transacting general business.

T. E. BRAIN,
Acting Secretary.

Waterloo Station,
London.
19th February, 1942.

London Midland & Scottish Railway Company

NOTICE IS HEREBY GIVEN that the next ORDINARY GENERAL MEETING of the London Midland and Scottish Railway Company will be held at FRIENDS HOUSE, EUSTON ROAD, LONDON, N.W., on Friday, the 6th March, 1942, at 11.30 a.m. precisely, for the transaction of the general business of the Company.

THOMAS ROYDEN, Chairman.
G. R. SMITH, Secretary.

Euston Station,
London, N.W.1.
19th February, 1942.

Official Notices

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is 9.30 a.m. on the preceding Monday. All advertisements should be addressed to:—The Railway Gazette, 33, Tothill Street, Westminster, London, S.W.1.

Railway and Other Reports

Mexican Eastern Railway Co. Ltd.—Report for 1940 shows £230 received from the Intercoceanic Railway of Mexico under the schemes of arrangement of 1927 and 1931, with expenses £230. No credit is taken for £13,841, interest on certificates of indebtedness of the Intercoceanic Railway, nor is any charge made in respect of interest on deferred debenture interest outstanding at December 31, 1926.

Vera Cruz (Mexico) Railways Limited.—Report to June 30, 1941, showed a loss of £1,044, against a profit of £1,224, with £46,215 carried forward, against £47,259. Negotiations after the judgment obtained against the company by Vera Cruz Terminal, led to two agreements, one with the Terminal company, and the other with the Mexican and Intercoceanic Railway companies. Under the first agreement payment of £150,000 plus interest has been made to Vera Cruz Terminal and trustees, with a contribution towards their costs, and the second agreement provides for the transfer to the company of bonds of the aggregate nominal value of \$500,000 (Mex.).

Intercoceanic Railway of Mexico (Acapulco to Vera Cruz) Limited.—The report for 1940 states that no settlement of claims against the Mexican Government has been obtained and no compensation has been received. Therefore no revenue account of balance sheet is presented. Returns from Mexico show that the operation of the Intercoceanic System (which includes the lines of the Mexican Southern Railway and the Mexican Eastern Railway) resulted in a loss of 8,401,000 Mexican pesos (against loss of 5,736,000 pesos). Adding charge in sterling for the company's proportion of debenture interest and working charges of Vera Cruz Terminal Company and certain interest charges, the total loss for the year was £864,000 (against loss of £599,000).

The English Electric Company.—Ordinary dividend for the year 1941 is again 10 per cent., less tax. Profit is given as £362,604 (against £363,736).

Foreign Railways Investment Trust.—Gross receipts for the year to October 31, 1941, were £11,426 (against £12,643). Net revenue was £89 (against £858). The amount carried forward was £46,616 (against £46,526). Investments were £2,717,623 (against £2,768,344); the directors have not made a valuation, but state there is heavy depreciation.

Bermuda Railways Investment Co. Ltd.—Report to September 30 shows total receipts of operating company, for the year ended June 30, £51,219, against £41,929, and working expenses £35,065 against £34,313, giving net earnings £16,154, compared with £7,616. No payments were received during the year from the operating company towards interest on bonds or loans, and the debit for the year was £27,586, increasing debit forward to £260,719. At a meeting in December 16 it was agreed to extend the moratorium.

Contracts and Tenders

On and from Monday, February 9, the address of the L.M.S.R. Advertising & Publicity Department is: Central Offices, Euston Station, London, N.W.1 (Telephone: Euston 1234).

The Bengal-Nagpur Railway has placed an order, to the inspection of Messrs. Wolfe Barry, Robert White and Partners, with Linley & Co. Ltd., for 30 firebox plates.

The Chilean Nitrate Sales Corporation has ordered eight 40-ton diesel-electric mining locomotives from the U.S. General Electric Company.

The United States has placed orders for a total of 5,016 new freight wagons for

export (probably to Egypt and Iran, according to the *Railway Age*), including 3,850 8-wheel wagons and 1,166 4-wheel wagons. The War Department has also ordered 2,000 box wagons and 166 caboose wagons from the American Car & Foundry Company for export to Egypt and Iran.

November, 1941, shipments from the United States of locomotives numbered 89, compared with 102 in October, and 86 in November, 1940, according to reports from builders to the Department of Commerce Bureau of the Census. Shipments for the first 11 months of last year totalled 874 locomotives, and included 160 steam, 17 electric, 645 diesel-electrics, and 52 of other types. Comparable figures for the first 11 months of 1940 are 517 locomotives, including 127 steam, 370 diesel-electrics, and 20 of other types.

The United States railways placed in 1941 the largest total orders for locomotives, freight wagons, and materials since 1929, and much larger orders for equipment than in that year, states Reuters Trade Service from New York. A survey by the *Railway Age* shows that Class I railways received materials, and ordered from builders, goods costing \$1,250,000,000, an increase of 50 per cent. on the 1940 figure, and of 126 per cent. on the annual average for the ten-year period 1931-1940. In 1940 the figure was \$833,000,000, and for the preceding ten years about \$551,000,000 a year. For all railways the 1941 purchases are estimated at \$1,310,000,000 against \$870,000,000 in 1940. Due to lack of materials only 1,047 of the 1,436 locomotives ordered were built; this was the largest order since 1923 and the largest construction since 1926. Of 118,371 freight wagons ordered 67,852 were built; this was the largest order since 1924, and the largest number built since 1930. There were 548 passenger vehicles ordered and 229 built, both the largest numbers since 1937.

Railway Stock Market

War developments continued to have a depressing influence on all sections of the Stock Exchange, and the decline in values has been widespread in the absence of demand. Although selling was rather more pronounced than a week ago, it was not heavy, and it is apparent that there is continued willingness to take a long view due to general confidence as to the ultimate outcome of the war. In a large measure the decline in values arose from a precautionary marking down of prices by jobbers; at the time of writing the general undertone of markets is tending to improve in the absence of any heavy selling pressure. The knowledge that large sums of money continue to await reinvestment due to the requisitioning of Indian and Canadian securities, has again proved a helpful influence to British Funds, which, however, were unable to move against the general trend on the Stock Exchange. Had more normal conditions prevailed, there seems little doubt that railway securities would have attracted a good deal of attention, bearing in mind that, as to home railway issues, there is the important factor of the impending dividends which will be announced by the time these notes are in print, and as to Argentine rails, the memorandum to the Argentine Government would have assisted stocks in this section of the market. As it is, most movements in

railway securities have reflected the reactionary trend of markets, although selling appears to have been comparatively light, and the reduced prices are attributed mainly to the very small demand. The home railway dividend statements and reports will be an important market factor because they will doubtless throw some light on the manner in which the railways intend to deal with charges in respect of war damage. The course to be followed in this connection will have a vital bearing on future dividend policy. At the time of writing, declines in home railway stocks have been moderate when compared with many other groups of securities. Prior charges remained firmly held in view of their high-class investment merits, and the junior issues are showing a rallying tendency in advance of the dividend statements.

At the time of writing, Great Western ordinary stock is 44½, compared with 44½ a week ago. This railway's 5 per cent. preference stock reacted a point to 109½, and the guaranteed stock was maintained at 129½; the 4 per cent. debentures at 114 were virtually the same as a week ago. Exceptionally, L.M.S.R. ordinary improved from 18½ to 18½, but the preference issues lost part of their recent rise, the senior stock was two points down at 69, and the 1923 issue 52, compared with 53 last week. L.M.S.R. 4 per cent. debentures remained,

firm, and at 106 were virtually unchanged on balance, as was the guaranteed stock, which at 102 also showed only a fractional decline. L.N.E.R. guaranteed stocks, which were recently attracting attention on yield considerations, held most of their recent gains. The first guaranteed, 92½ at the time of writing, was within half a point of the price current a week ago, and the second guaranteed was 82½, compared with 83½. L.N.E.R. first preference moved down from 52 to 51, but the second preference rallied from 19½ to 20. This railway's 3 per cent. debentures were maintained at 79½, but the 4 per cent. debentures were slightly lower at 104½, compared with 105. As in other directions, fluctuations in Southern stocks were most marked in the junior issues; the prior charges have remained firmly held. Southern deferred, however, was 16½, as against 16½ a week ago, and the preferred 63½. The 5 per cent. preference was a point down at 107, although the 4 per cent. debentures were only fractionally lower at 114. Elsewhere, London Transport "C" was 40½, which compares with 40½ a week ago.

Among Argentine railway issues, declines were widespread, due to surrounding market conditions, but no heavy selling was reported. B.A. Gt. Southern ordinary was 9, and the 4 per cent. debentures 57. Elsewhere, Leopoldina debentures held part of their recent improvement. Canadian Pacific Railway issues were inclined to be reactionary.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1941-42	Week Ending	Traffic for Week		No. of Weeks	Aggregate Traffic to date			Shares or Stock	Prices			
				Total this year	Inc. or Dec. compared with 1941		Totals		Increase or Decrease		Highest 1941	Lowest 1941	Feb. 13 1942	Yield % (See Note)
							This Year	Last Year						
South & Central America	Antofagasta (Chili) & Bolivia	834	8.2.42	£ 19,080	+ £ 5,050	6	£ 121,530	£ 101,620	+ £ 19,910	Ord. Stk.	10½	3½	10½	NII
	Argentine North Eastern	753	7.2.42	ps. 136,300	+ ps. 17,200	32	ps. 5,761,200	ps. 4,874,800	+ ps. 886,400	Ord. Stk.	4	1	3½	NII
	Bolivar	174	Jan., 1942	4,960	+ 1,760	5	4,960	3,200	+ 1,760	6 p.c. Deb	5	5	7	NII
	Brazil	...	...	...	...	...	...	...	...	Bonds	8	2½	10½	NII
	Buenos Ayres & Pacific	2,801	7.2.42	ps. 1,775,000	+ ps. 65,000	32	ps. 43,683,000	ps. 40,498,000	+ ps. 3,185,000	Ord. Stk.	7½	1½	9½	NII
	Buenos Ayres Great Southern	5,082	31.1.42	ps. 2,962,000	+ ps. 257,000	31	ps. 71,774,000	ps. 62,759,000	+ ps. 9,015,000	Ora. Stk.	10½	31	9½	NII
	Buenos Ayres Western	1,930	31.1.42	ps. 1,302,000	+ ps. 342,000	31	ps. 26,198,000	ps. 21,640,000	+ ps. 4,558,000	"	9	2½	8½	NII
	Central Argentine	3,700	7.2.42	ps. 1,809,100	—	32	ps. 56,345,450	ps. 46,086,250	+ ps. 10,259,200	"	8½	2½	6½	NII
	Do.	...	...	...	...	...	...	...	...	Dfd.	2½	—	3	NII
	Cent. Uruguay of M. Video	972	31.1.42	ps. 27,021	+ 1,404	31	712,699	662,856	+ 49,843	Ord. Stk.	9½	1	6½	NII
	Costa Rica	188	Dec., 1941	21,753	+ 2,770	26	135,989	118,038	+ 17,951	Stk.	15½	11½	13½	14½
	Dorada	70	Jan., 1942	10,600	+ 1,600	5	10,600	12,200	+ 1,600	1 Mt. Db.	97	97	90½	6½
	Entre Rios	808	7.2.42	ps. 233,600	+ ps. 20,500	32	ps. 8,392,200	ps. 6,972,200	+ ps. 1,420,000	Ord. Stk.	6½	1½	6	NII
	Great Western of Brazil	1,030	7.2.42	12,600	+ 200	6	70,400	69,100	+ 1,300	Ord. Sh.	11½	1½	8	NII
	International of Cl. Amer.	794	Dec., 1941	\$519,619	+ \$73,379	52	\$5,617,278	\$5,544,439	+ \$72,839	"	—	—	—	NII
	Interoceanic of Mexico	...	...	...	...	...	...	...	...	1st Pref	—	6d	—	NII
	La Guaira & Caracas	22½	Jan., 1942	6,430	+ 305	5	6,430	6,125	+ 305	"	—	—	—	NII
	Leopoldina	1,918	7.2.42	27,353	+ 3,865	6	160,496	131,030	+ 29,466	Ord. Stk.	4½	—	4	NII
	Mexican	483	7.2.42	ps. 318,400	+ ps. 47,300	6	ps. 1,737,700	ps. 1,581,300	+ ps. 156,400	"	—	—	—	NII
	Midland of Uruguay	319	Dec., 1941	12,418	+ 272	26	80,163	69,877	+ 10,286	"	—	—	—	NII
	Nitrate	386	31.1.42	5,563	+ 142	5	11,036	10,252	+ 784	Ord. Sh.	66½	1½	3½	7½
	Paraguay Central	274	7.2.42	\$3,052,000	+ \$437,000	32	\$109,674,000	\$105,787,000	+ \$3,887,000	P.r. Lt. Stk.	43½	29	42½	3½
	Peruvian Corporation	1,059	Jan., 1942	80,429	+ 12,609	31	512,971	461,145	+ 51,826	Pref.	6	1½	8	NII
	Salvador	100	Dec., 1941	c117,000	+ c32,000	26	c361,172	c288,683	+ c72,489	"	—	—	—	NII
	San Paulo	153½	1.2.42	37,500	+ 2,650	5	151,750	158,915	+ 7,165	Ord. Stk.	52	24½	47	4½
	Taital	160	Jan., 1942	3,135	+ 840	31	30,895	19,435	+ 11,460	Ord. Sh.	13	6½	18	NII
	United of Havana	1,346	7.2.42	33,456	+ 2,979	32	638,719	513,312	+ 125,407	Ord. Stk.	2½	—	3½	NII
	Uruguay Northern	73	Dec., 1941	1,268	+ 190	26	7,938	7,089	+ 849	"	—	—	—	NII
Canada	Canadian National	23,560	7.2.42	1,287,800	+ 306,800	6	6,481,200	5,166,400	+ 1,314,800	Perp. Dbs	94½	85½	—	—
	Canadian Northern	...	...	...	...	...	...	...	...	4 p.c. Gr	104½	99½	—	—
	Grand Trunk	...	...	...	...	...	...	...	...	Ord. Stk.	13	7½	1½	NII
India	Canadian Pacific	17,13½	7.2.42	901,400	+ 220,800	6	4,633,400	3,607,600	+ 1,025,800	"	—	—	—	NII
	Barsi Light	202	30.11.41	3,525	+ 135	34	115,072	105,555	+ 9,517	"	—	—	—	NII
	Bengal & North Western	2,099	Jan., 1942	259,350	+ 20,161	18	1,093,450	1,036,512	+ 56,938	Ord. Stk.	345	253	341½	4½
Various	Bengal-Nagpur	3,249	10.10.41	234,750	+ 14,924	27	4,993,938	4,533,077	+ 460,861	"	101	95½	100½	7½
	Madras & Southern Mahratta	2,939	30.11.41	190,350	+ 22,380	34	4,786,245	3,985,424	+ 800,821	"	105½	101½	102½	4½
	Rohilkund & Kumaon	571	Jan., 1942	56,850	+ 10,343	18	210,675	220,257	+ 9,582	"	342	290	3½	4½
Various	South Indian	2,402	30.11.41	140,022	+ 23,628	34	3,528,581	3,037,730	+ 490,851	"	100	87	9½	3½
	Beira	204	Nov., 1941	68,593	—	9	150,693	—	—	Prf. Sh.	1½	29½	2½	NII
	Egyptian Delta	610	31.10.41	11,565	+ 1,176	29	168,612	117,730	+ 50,882	B. Deb.	68	45	50	7½
	Manila	...	...	...	...	...	...	...	...	Inc. Deb	90½	85½	89½	6½
	Midland of W. Australia	277	July, 1941	18,648	+ 7,251	4	18,648	11,397	+ 7,251	"	—	—	—	NII
	Nigerian	1,900	29.11.41	76,668	+ 11,298	34	1,827,367	1,314,395	+ 512,972	"	—	—	—	NII
	Rhodesia	2,442	Nov., 1941	476,589	—	9	959,642	—	—	"	—	—	—	NII
South Africa	13,291	20.12.41	814,319	+ 23,535	38	29,000,980	26,188,469	+ 2,812,511	"	—	—	—	NII	
Various	Victoria	4,774	Sept. 1941	1,052,397	+ 161,210	13	3,053,542	2,648,904	+ 404,638	"	—	—	—	NII

Note. Yields are based on the approximate current prices and are within a fraction of ½.
† Receipts are calculated @ ls. 6d. to the rupee

Argentine traffics are given in pesos
‡ ex dividend